9-1220-220-34

TM 9-1220-220-34

TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

VOLUME I - TROUBLESHOOTING

VOLUME II - MAINTENANCE

BALLISTIC DRIVE:

M10 (1220-00-676-2184)

M10A1 (1220-00-076-9765)

M10A3 (1220-00-572-8735)

M10A4 (1220-00-856-9453)

M10A5 (1220-00-980-9297)

M10A6 (1220-00-933-1203)

VOLUME I TROUBLESHOOTING

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INTRODUCTION 1-1

CHAPTER 2
TROUBLESHOOTING 2-1

VOLUME II MAINTENANCE

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CHAPTER 2
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JUNE 1985

HEADQUARTERS, DEPARTMENT OF THE ARMY

D 101.11:

READEX FICHE best copy available

WARNING

CLEANING SOLVENT CAN CAUSE FIRES

Cleaning solvents and the fumes from cleaning solvents can catch fire. Keep it and all materials that can catch on fire away from flames. Use only in a room with a lot of fresh air.

Technical Manual
No. 9-1220-220-34

HEADQUARTERS,
DEPARTMENT OF THE ARMY
Washington, D.C., 24 June 1985

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know.

Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to:

Commander
U.S. Army Armament, Munitions and Chemical Command
ATTN: AMSMC-MAS
Rock Island, IL 61299-6000
A reply will be furnished to you.

* This manual supersedes TM 9-1220-220-34, January 1963, including all changes.

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HOW TO USE THIS MANUAL

This manual has two volumes of maintenance information you will need to repair and service the M10 Series Ballistics Drive.

- Volume I - Troubleshooting
- Volume II - Maintenance

The organization paragraph in each volume tells you what information you can find in each chapter and appendix.

There are four ways to find any maintenance information you need:

- Index on the front cover which tells what information is contained in each chapter.
- Table of Contents located at the front of the manual which has a complete listing by paragraph number and page number
- Performance Test (Vol I, Chap 2)
- Maintenance Task Index (Vol II, App B) which lists major assemblies, subassemblies and paragraph numbers of all maintenance procedures

Before doing any maintenance, you should read and understand HOW TO TROUBLESHOOT on page 1-2. If you do not know the equipment well, you should read the section on description and data (Vol II, Chap 1).

Throughout the manual reference is made to a Job Performance Guide 113-091-9000R (JPG 41C) which helps you to develop skills in doing the maintenance tasks.

TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

VOLUME I - TROUBLESHOOTING

BALLISTICS DRIVE:
M10

M10A1

M10A3

M10A4

M10A5

M10A6

CHAPTER 1
INTRODUCTION

1-1. SCOPE

This volume contains troubleshooting requirements and procedures for direct support and general support (DS/GS) maintenance of the M10 Series Ballistics Drive. See Volume II for maintenance procedures.

1-2. ORGANIZATION

All troubleshooting requirements for checking out the M10 Series Ballistics Drive and for finding fault symptoms are given in Chapter 2. See paragraph 1-3 for how to troubleshoot.

1-3. HOW TO TROUBLESHOOT

The following steps tell you how to troubleshoot. A diagram of these steps is on page 1-3.

(A) Do a visual check and list any faults on DA Form 2404 before making repairs. See Vol II, Chap 3 for what to check for.

(B) If you see any faults that may affect the performance test, fix them now. This does not mean small things like painting scratches.

(C) Do the performace test in Vol I, Chap 2 from the beginning until you find a fault symptom.

(D) Do the maintenance action required to correct the fault (Vol II, Chap 4).

(E) After the bad part has been repaired or replaced, do the performance test in Chapter 2 again. This is to make sure the new part has fixed the problem.

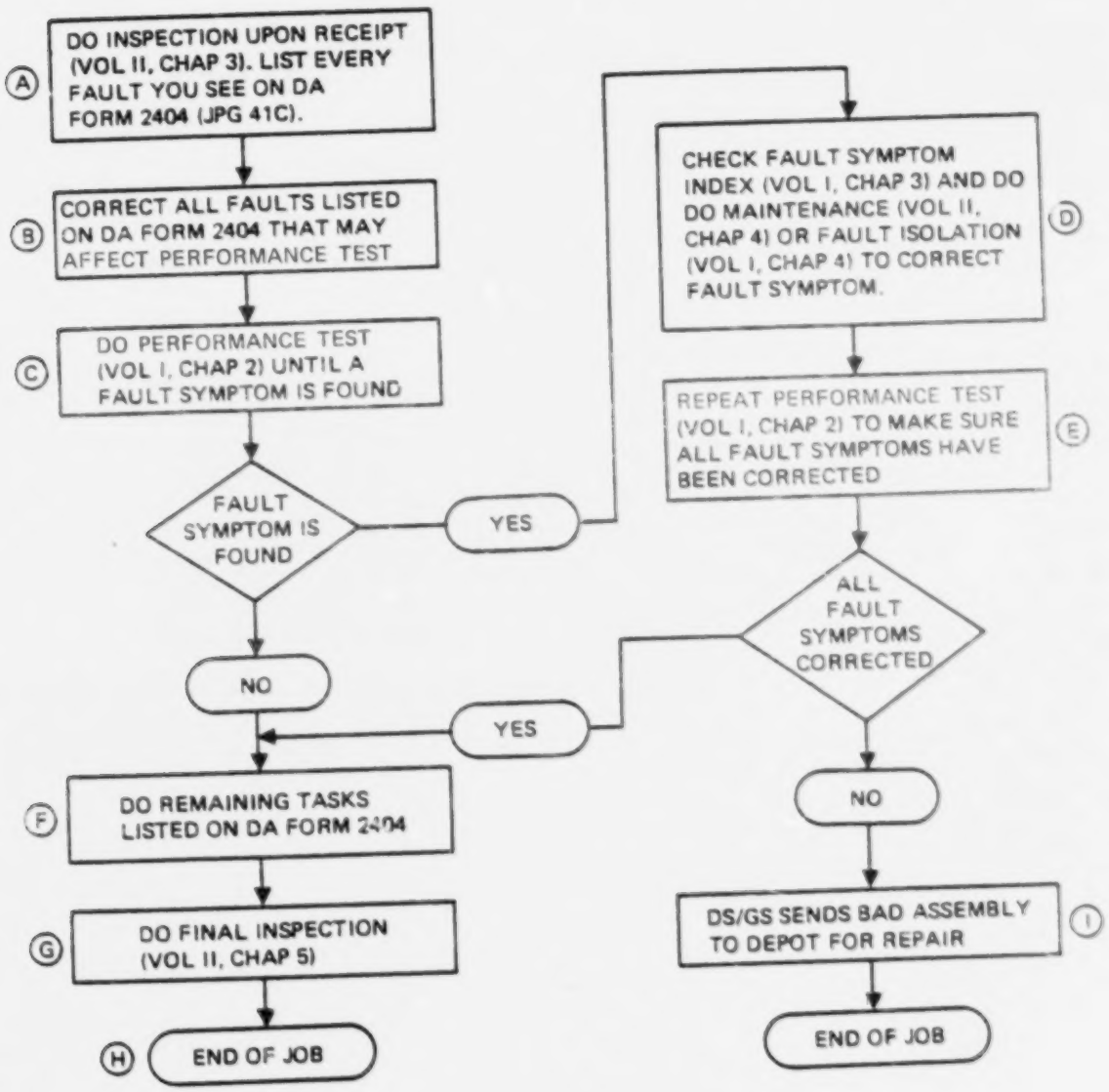
(F) If all the faults are now corrected, do the remaining maintenance tasks on DA Form 2404.

(G) Do the final inspection given in Vol II, Chap 5.

(H) The job is over and the good assembly is sent back to service.

(I) If all faults were not corrected after step E, the bad assembly is sent back to the depot for repair.

1-3. HOW TO TROUBLESHOOT (CONT)


A
DO INSPECTION UPON RECEIPT (VOL II, CHAP 3). LIST EVERY FAULT YOU SEE ON DA FORM 2404 (JPG 41C).
B
CORRECT ALL FAULTS LISTED ON DA FORM 2404 THAT MAY AFFECT PERFORMANCE TEST
C
DO PERFORMANCE TEST (VOL I, CHAP 2) UNTIL A FAULT SYMPTOM IS FOUND
FAULT SYMPTOM IS FOUND
YES
NO
D
CHECK FAULT SYMPTOM INDEX (VOL I, CHAP 3) AND DO DO MAINTENANCE (VOL II, CHAP 4) OR FAULT ISOLATION (VOL I, CHAP 4) TO CORRECT FAULT SYMPTOM.
E
REPEAT PERFORMANCE TEST (VOL I, CHAP 2) TO MAKE SURE ALL FAULT SYMPTOMS HAVE BEEN CORRECTED
ALL FAULT SYMPTOMS CORRECTED
YES
NO
F
DO REMAINING TASKS LISTED ON DA FORM 2404
G
DO FINAL INSPECTION (VOL II, CHAP 5)
H
END OF JOB
I
DS/GS SENDS BAD ASSEMBLY TO DEPOT FOR REPAIR
END OF JOB

1-4. TEST EQUIPMENT

No special test equipment is needed to do the performance test on the M10 Series Ballistics Drive.

CHAPTER 2

TROUBLESHOOTING

2-1. SCOPE

Troubleshooting of the M10 Series Ballistics Drive is done by following the performance test. If you find a symptom, look in the maintenance action column to find out what to do to correct it. it.

2-2. PERFORMANCE TEST

TOOLS: Multimeter

SUPPLIES: Black thread
Tape or strap
Pencil
Paper
Binoculars

PERSONNEL: Two

REFERENCES: TM 10 Series manuals for removing and installing firing mechanism of gun, M60, M60A1 TM 9-2350-215-0 and TM 9-2350-260-10, M60A3 TM 9-2350-253-10, M60A1 (Rise), M60A1 Rise (Passive) TM 9-2350-257-10-2, M48A5 TM 9-2350-258-10, TM 20 Series manuals for synchronizing and aligning and replacing lamps, M60, M60A1 TM 9-2350-215-20 and TM 9-2350-260-20-2, M60A3 TM 9-2350-253-20-2, M60A1 Rise, M60A1 Rise (Passive) TM 9-2350-257-20-2-1, M48A5 TM 9-2350-258-20

EQUIPMENT CONDITION: Ballistics drive mounted on vehicle

PRELIMINARY PROCEDURES: Remove firing mechanism of gun tube (TM 10)

2-2. PERFORMANCE TEST (CONT)

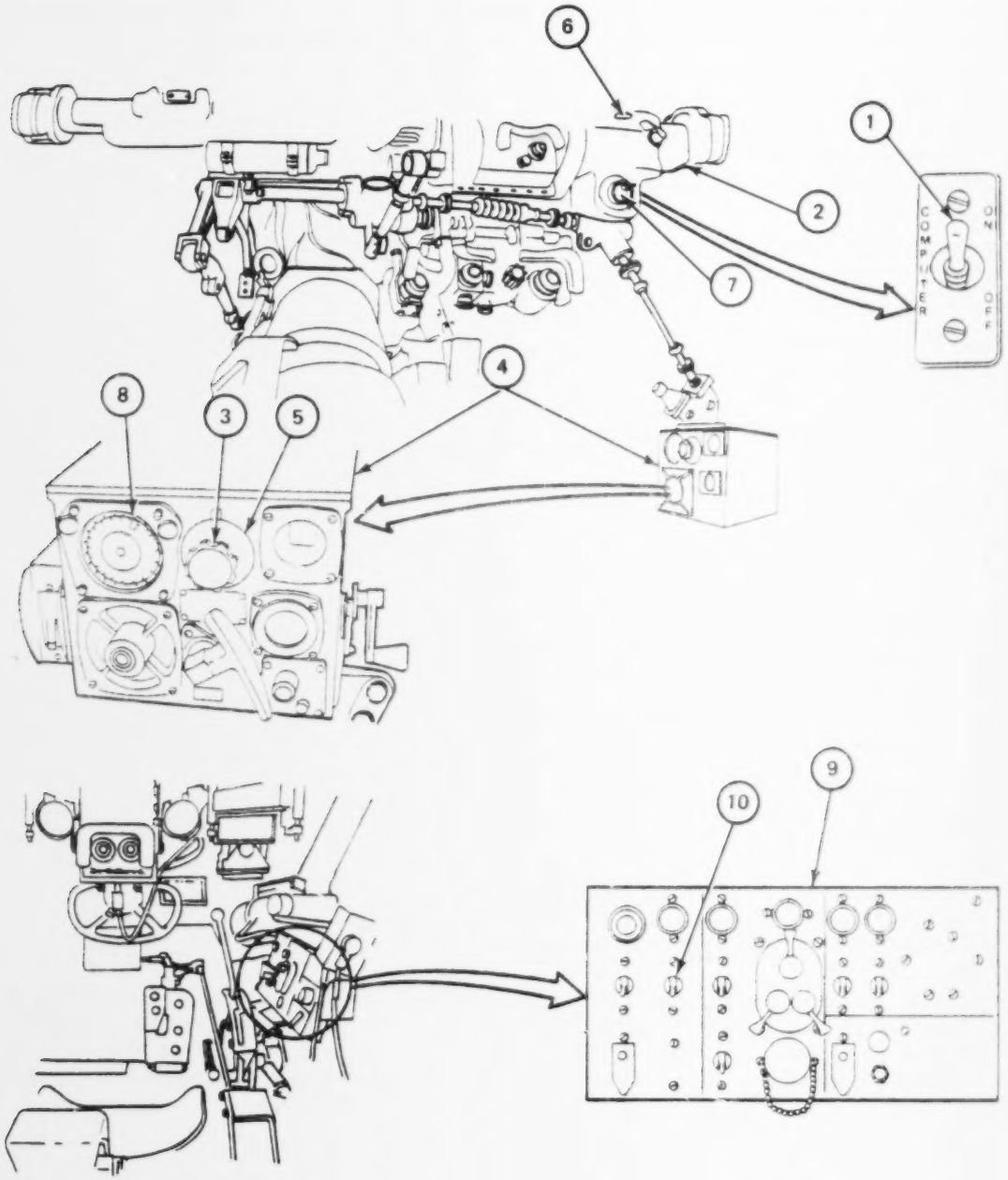
NOTE

Performance test should be performed operating the system manually.

FRAME 1

Step	Procedure	Symptom	Maintenance Action
1.	Set COMPUTER SWITCH (1) on range finder (2) to OFF.	. . .	. . .
2.	Pull out and turn range correction knob (3) on ballistics computer (4) until scale (5) reads 0 (zero).	. . .	. . .
3.	While looking into range scale window (6) of range finder (2), turn range knob (7) until range scale dial in window (6) reads 1000 meters.	. . .	. . .
4.	Check that inner (range) pointer (8) of ballistics computer (4) reads 1000 meters.	. . .	. . .
5.	Set driver's master control panel (9) MASTER SWITCH (10) to ON.	. . .	. . .
6.	Set COMPUTER switch (1) on range finder (2) to ON. GO TO FRAME 2	. . .	. . .

2-2. PERFORMANCE TEST (CONT)

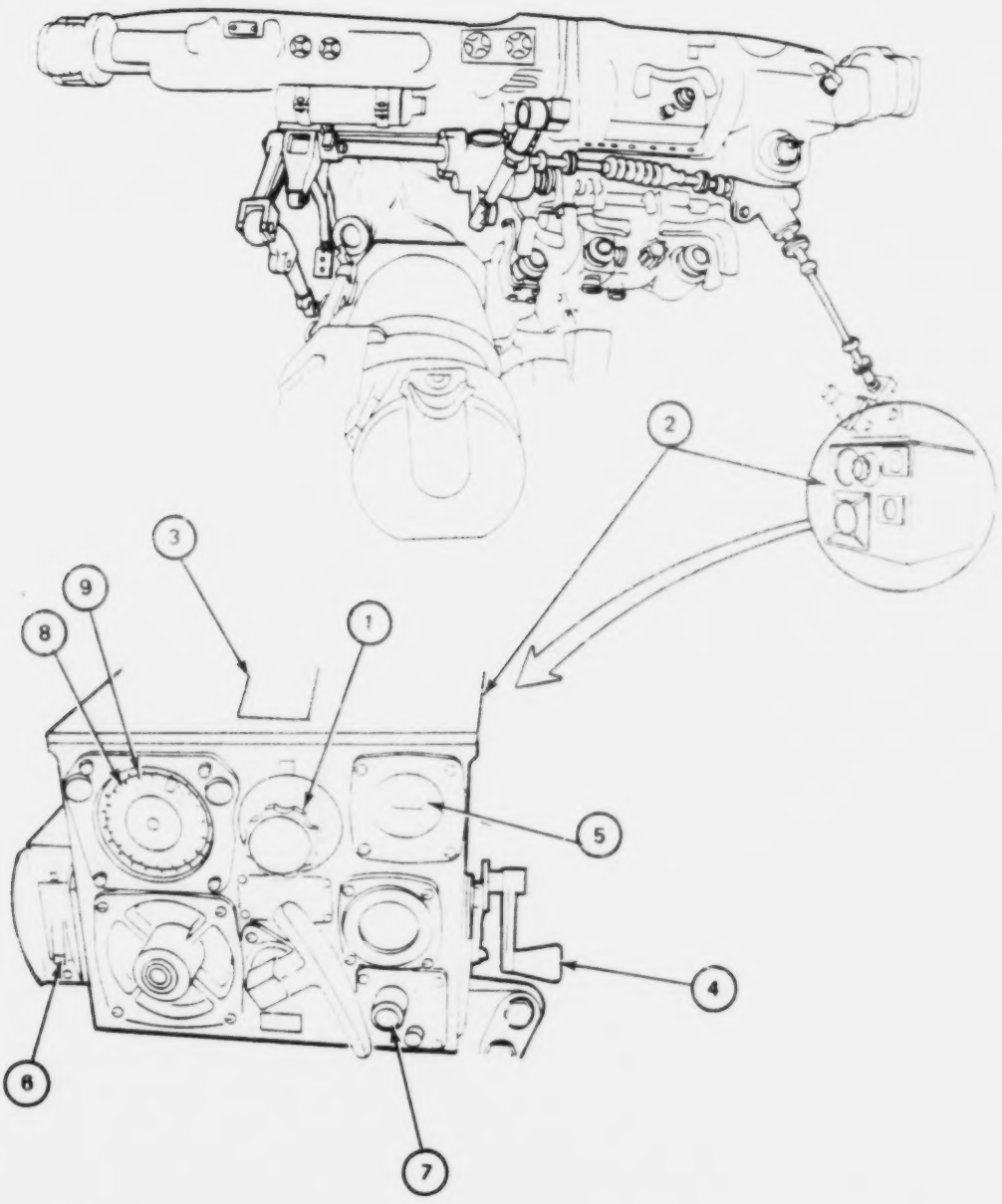


2-2. PERFORMANCE TEST (CONT)

FRAME 2

Step	Procedure	Symptom	Maintenance Action
1.	Set range correction knob (1) on ballistics computer (2) according to the number of effective rounds fired (see log book and decal on cover (3)).	. . .	. . .
2.	Pull range correction knob (1) out and turn right or left as required.	. . .	. . .
3.	Push in and turn superelevation hand crank (4) to the left until superelevation counter (5) reads 0 (zero).	. . .	. . .
4.	Set circuit breaker switch (6) to ON. **WARNING** Do not press reset button (7) on ballistics computer (2) until all personnel and equipment are out of the way of gun. Gun may move up or down.	. . .	. . .
5.	Press and release reset button (7) on ballistics computer (2).	. . .	. . .
6.	Note the reading of outer pointer (8) of ballistics computer (2).	. . .	. . .
7.	Check that range movement (reading of outer pointer (8)) is the same as reading on inner pointer (9). GO TO FRAME 3	Range movement is not the same	Set circuit breaker switch to OFF. Place correct number of turns on input shaft Vol II, para 4-4, frame 4, and para 4-5, frame 9).

2-2. PERFORMANCE TEST (CONT)

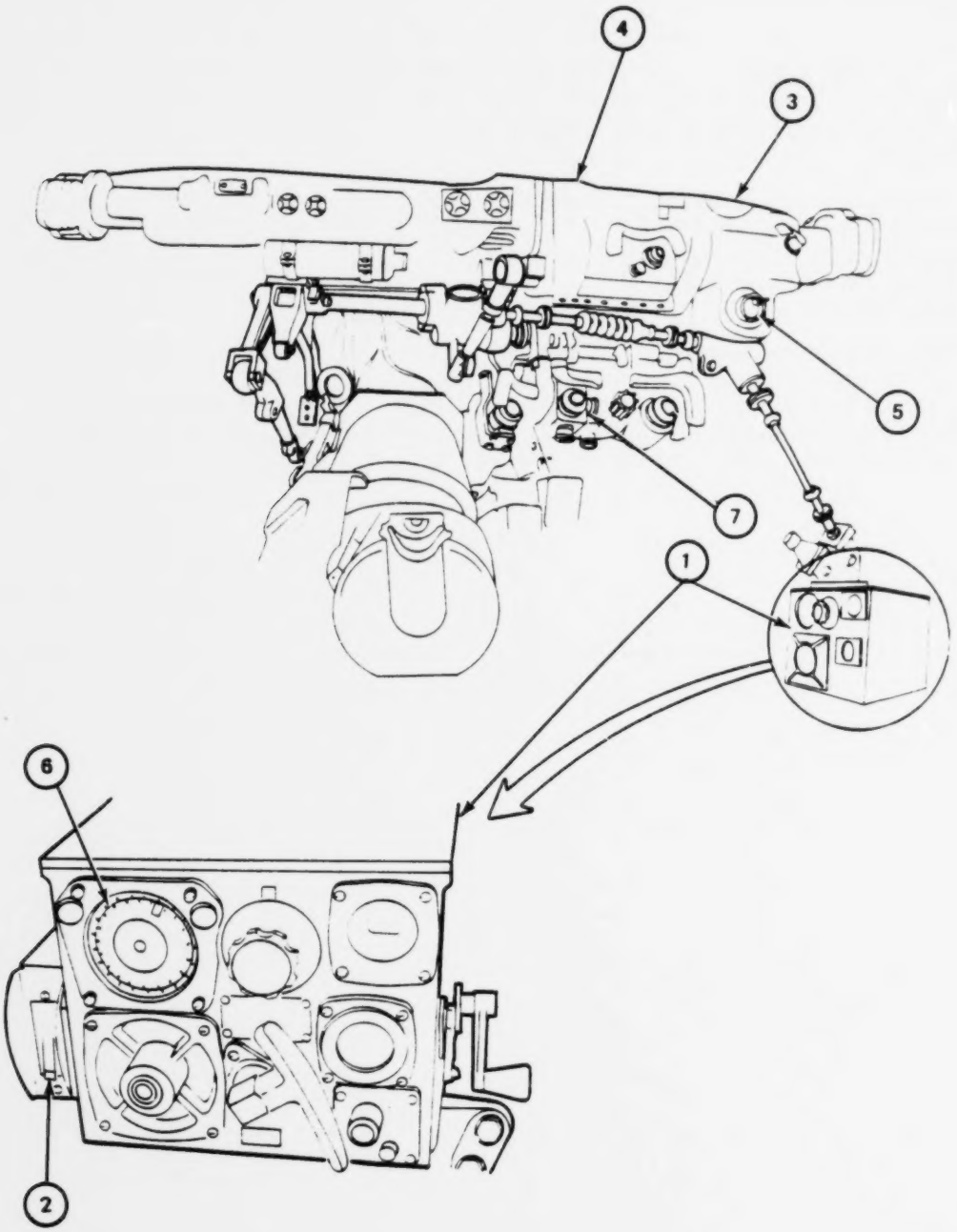


2-2. PERFORMANCE TEST (CONT)

FRAME 3

Step	Procedure	Symptom	Maintenance Action
1.	Check that ballistic computer (1) does not move back and forth more than ten times or does not stall.	Oscillation or stalling in ballistic computer.	Set circuit breaker switch (2) to OFF. Tell your supervisor.
2.	Set circuit breaker switch (2) to OFF.	. . .	. . .
3.	While looking into range scale window (3) of range finder (4), turn range knob (5) until range scale reads 2000 meters.	. . .	. . .
4.	Check that inner (range) index (6) of ballistic computer (1) reads 2000 meters. **WARNING** Do not set circuit breaker switch (2) to ON until all personnel and equipment are out of the way of gun movement.	. . .	. . .
5.	While looking into gunner's periscope (7), set circuit breaker switch to ON. Check that reticle moves smoothly (does not jerk or bounce). GO TO FRAME 4	Rough or bouncy movememt of gunner's periscope reticle.	Set circuit breaker switch (2) to OFF. Check and reposition ballistics drive (Vol II, para 4-4, frame 8, step 1 only; then go to para 4-5, frame 2).

2-2. PERFORMANCE TEST (CONT)

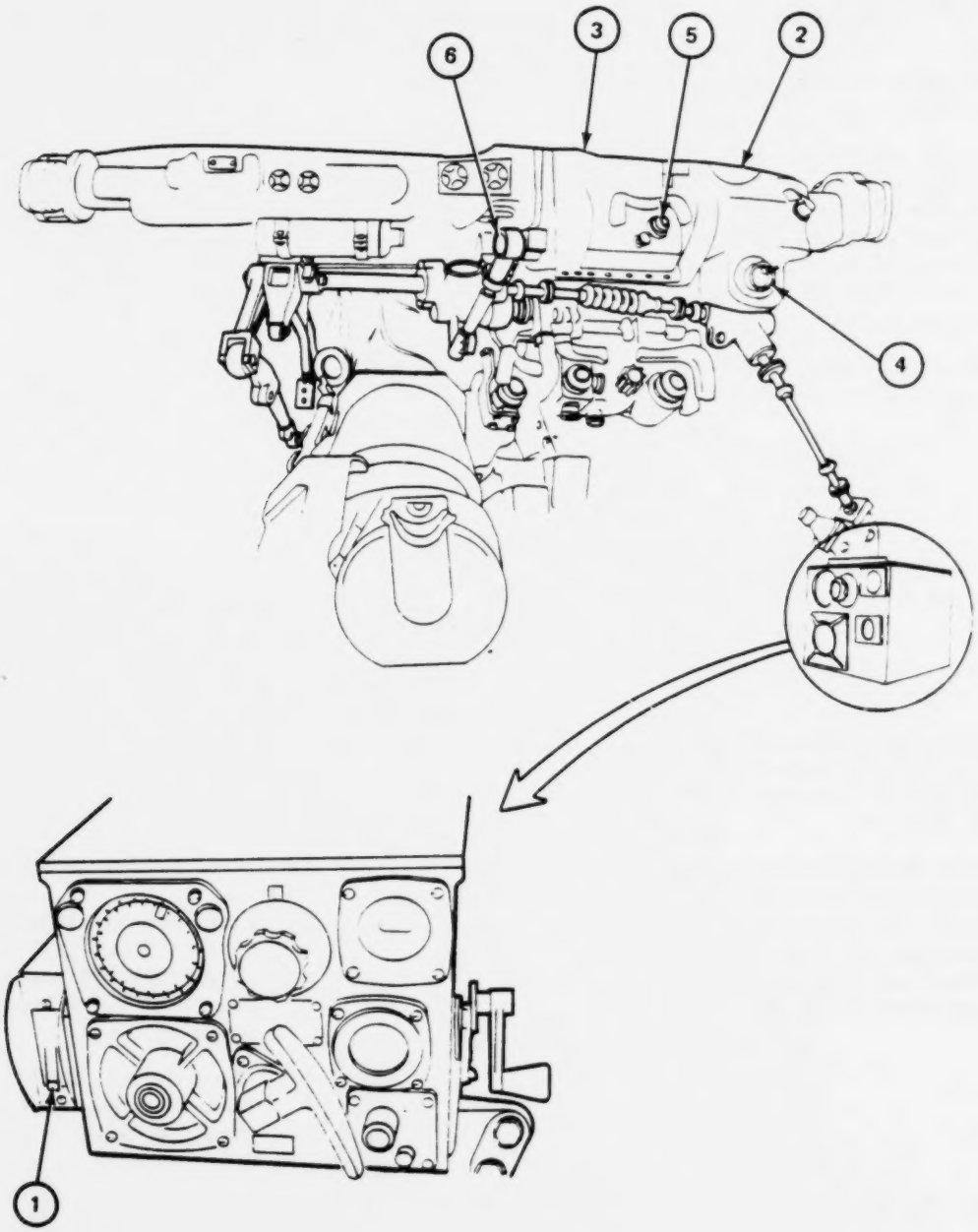


2-2. PERFORMANCE TEST (CONT)

FRAME 4

Step	Procedure	Symptom	Maintenance Action
1.	Set circuit breaker switch (1) to OFF.	. . .	. . .
2.	While looking into range view housing window (2) of range finder (3), turn range knob (4) until range scale reads 500 meters.	. . .	. . .
3.	While looking into range finder eyepiece (5), set circuit breaker switch (1) to ON. Check that reticle moves smoothly (does not jerk or bounce). GO TO FRAME 5	Rough or bouncy movement of rangefinder reticle.	Set circuit breaker switch (1) to OFF. Check connector assembly (6) for binding. If binding: a. Do maintenance procedure (TM 9-254). b. Repair range finder link connector assembly (Vol II, para 4-20).

2-2. PERFORMANCE TEST (CONT)

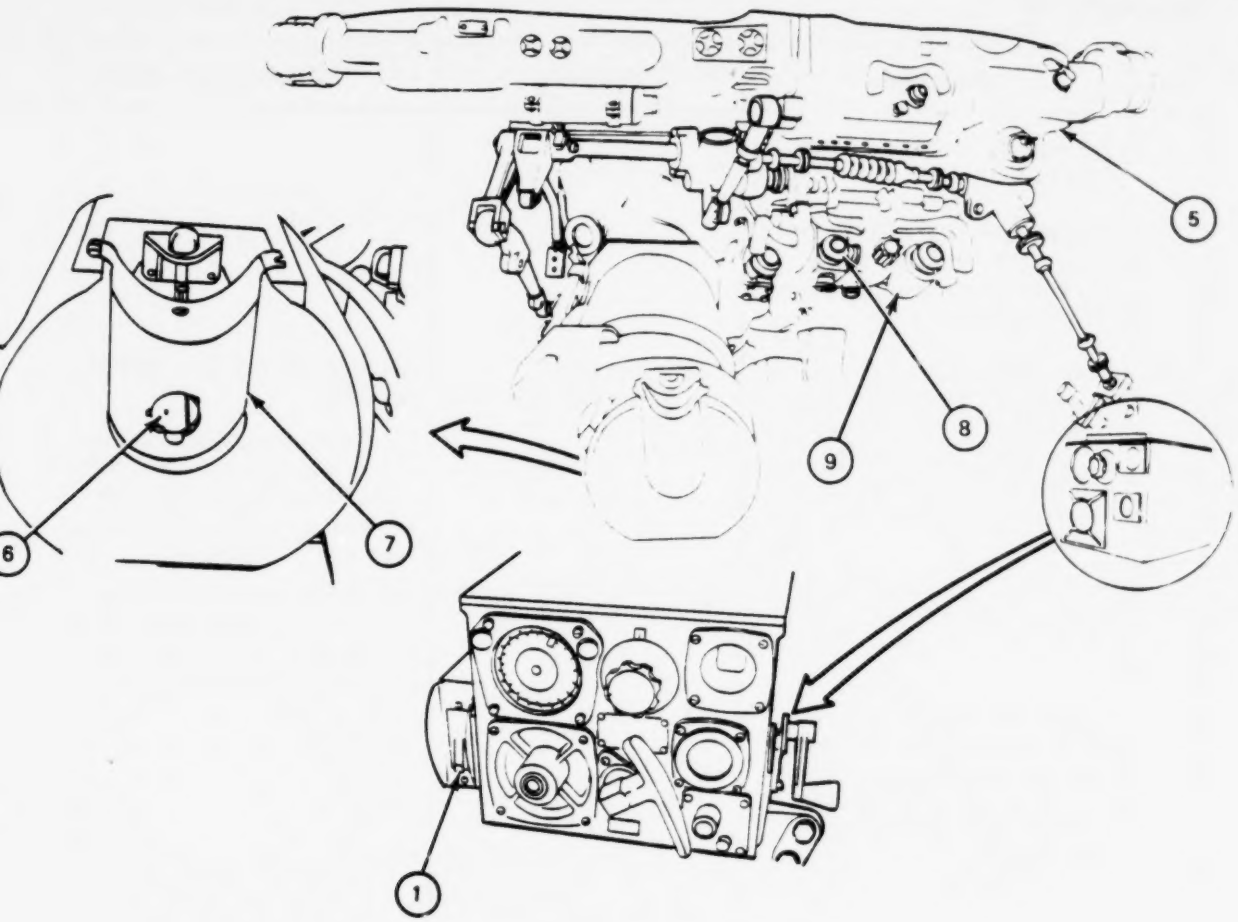


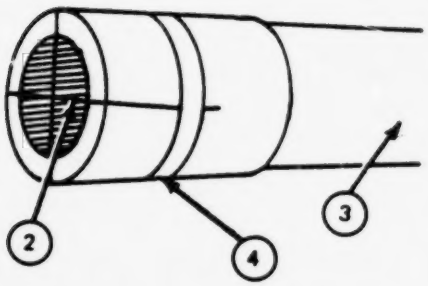
2-2. PERFORMANCE TEST (CONT)

FRAME 5

Step	Procedure	Symptom	Maintenance Action
1.	Set circuit breaker switch (1) to OFF.	. . .	. . .
2.	Put two pieces of black thread (2) over gun tube (3) (outside of tank at notches) to form crosshairs. Use tape or strap (4) to hold thread (2) in place (TM 10). (Thread must be tight).	. . .	. . .
3.	Using range finder (5), find a target about 1200 meters away. **WARNING** Do not set circuit breaker switch (1) to ON until all personnel and equipment are out of the way of gun movement.	. . .	. . .
4.	Set circuit breaker switch (1) to ON.	. . .	. . .
5.	Using right side of binoculars, look through firing pin hole (6) in breech block (7). (TM 10)	. . .	. . .
6.	Look through eyepiece (8) of gunner's periscope (9). Check that gunner's periscope (9) is boresighted (aimed at same target as rangefinder (1)). GO TO FRAME 6	Boresight and synchronization error.	Set circuit breaker switch to OFF. a. Level gun to within plus .5 minus 1.5 mils and adjust rangefinder link connector assembly (Vol II, para 4-5, frame 6). b. Place correct number of turns on input shaft (Vol II, para 4-4, frame 4 and para 4-5, frame 9).

2-2. PERFORMANCE TEST (CONT)



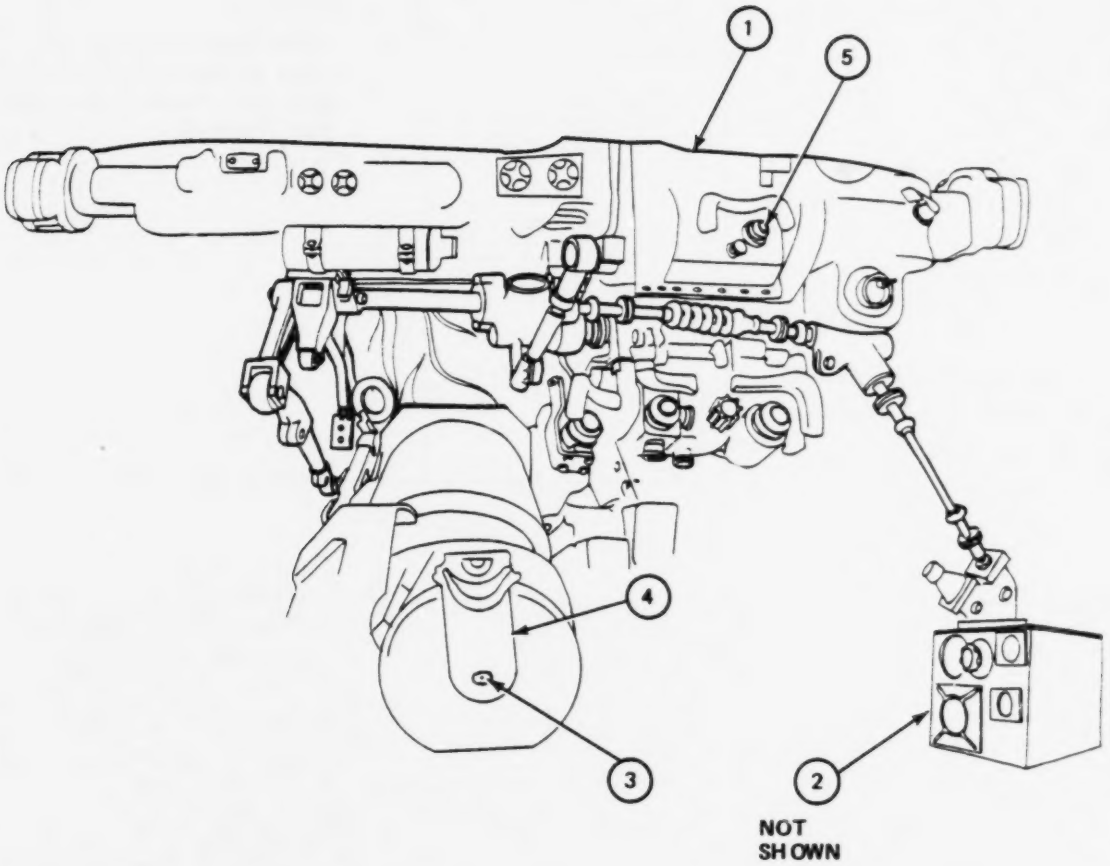


2-2. PERFORMANCE TEST (CONT)

FRAME 6

Step	Procedure	Symptom	Maintenance Action
1.	Set circuit breaker switch (1) to ON.		
2.	Using right side of binoculars, look through firing pin hole (6) in breech block (7). (TM 10)		
3.	Look through eyepiece (8) of gunner's periscope (9). Check that gunner's periscope (9) is boresighted (aimed at same target as rangefinder (1)).	Boresight and Synchronization error.	Set circuit breaker switch to OFF. a. Level gun to within plus .5 minus 1.5 mils and adjust rangefinder link connector assembly (Vol II, para 4-5, frame 6). b. Place correct number of turns on input shaft (Vol II, para 4-4, frame 4 and para 4-5, frame 9).
4.	While looking into eyepiece (5) of rangefinder (1), elevate or depress the gun and traverse the turret to find a target 600 meters away (TM 20-2) GO TO FRAME 7		

-2. PERFORMANCE TEST (CONT)

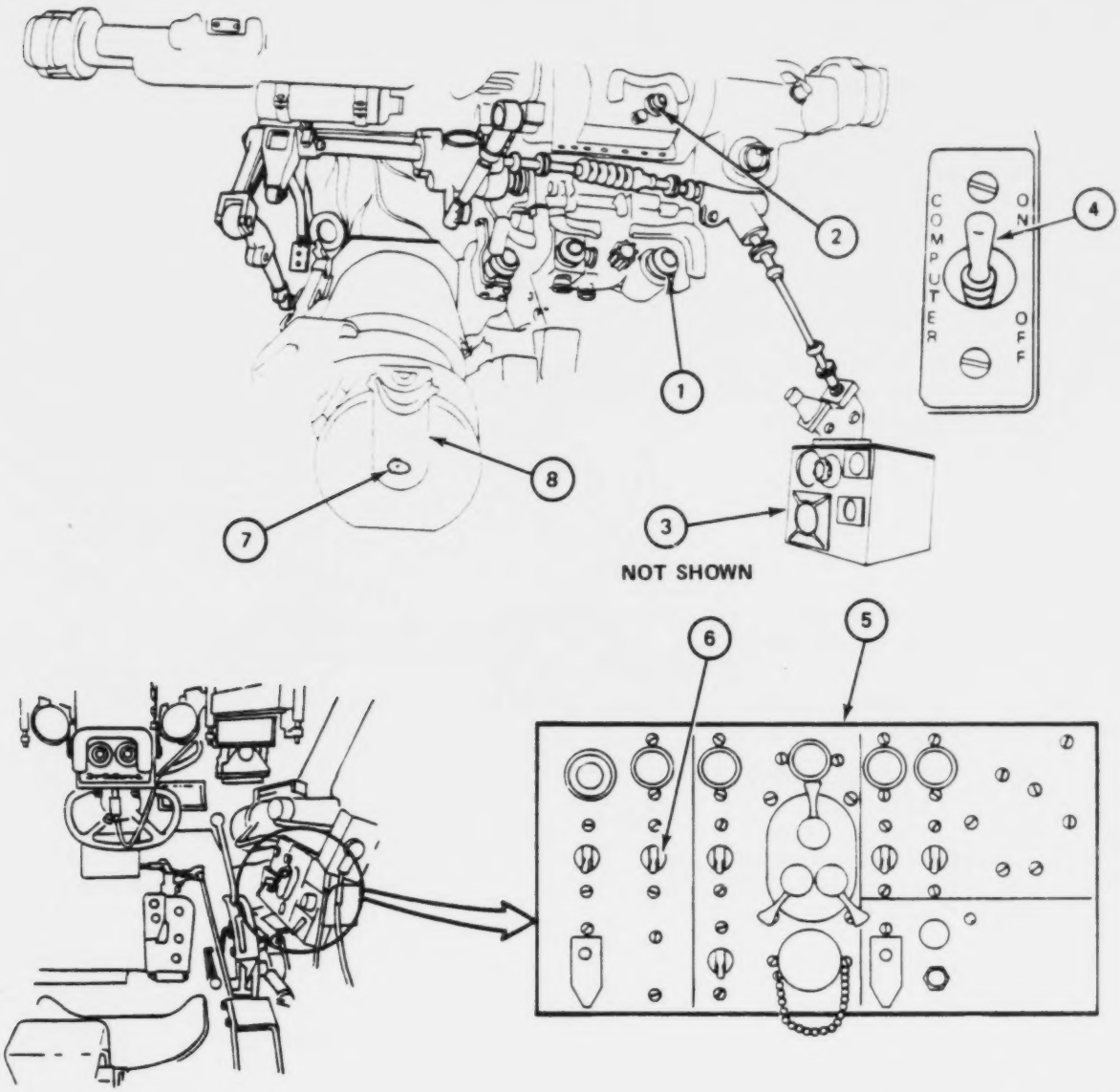


2-2. PERFORMANCE TEST (CONT)

FRAME 7

Step	Procedure	Symptom	Maintenance Action
1.	While looking through gunner's periscope (1), check that gunner's periscope (1) is aimed at same target as range finder (2).	Boresight and synchronization error.	Set circuit breaker switch to OFF. a. Level gun to within plus .5 minus 1.5 mils and adjust rangefinder link connector assembly (Vol II, para 4-5, frame 7) b. Place correct number of turns on input shaft (Vol II, para 4-4, frame 4 and para 4-5, frame 9)
2.	Set range finder (2) COMPUTER switch (4) to OFF.	. . .	. . .
3.	Set driver's master control panel (5) MASTER switch (6) to OFF.	. . .	. . .
4.	Install firing mechanism (7) in breech block (8). GO TO FRAME 8	. . .	. . .

2-2. PERFORMANCE TEST (CONT)

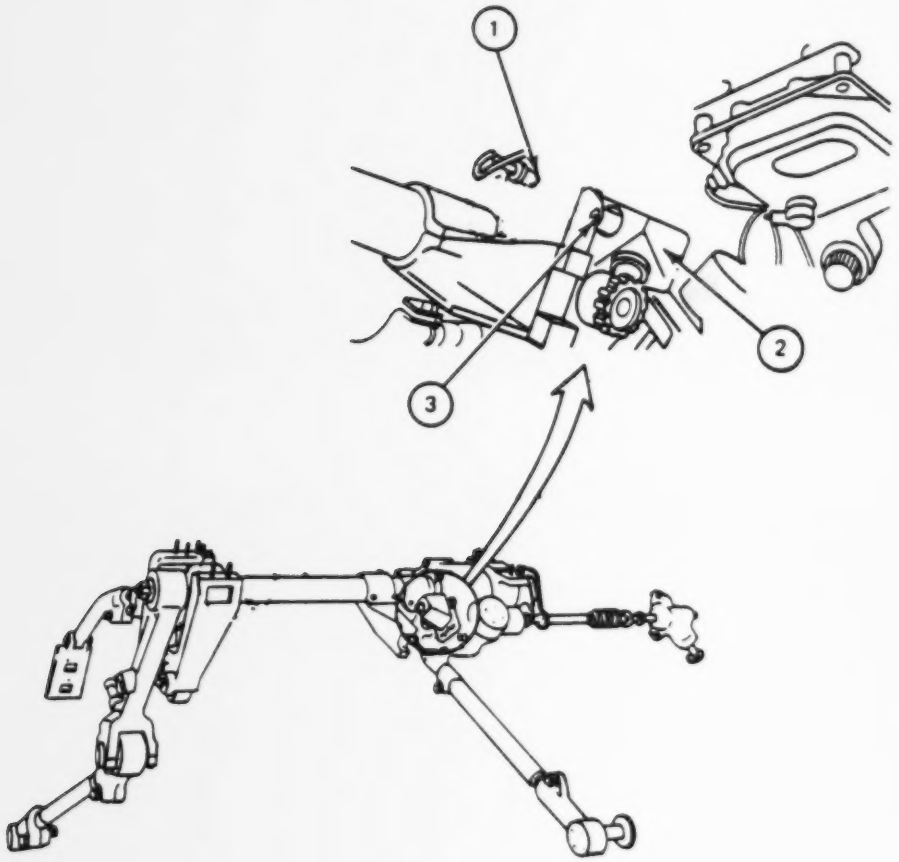


2-2. PERFORMANCE TEST (CONT)

FRAME 8

Step	Procedure	Symptom	Maintenance Action
	NOTE Do steps 1 thru 3 for M10, M10A1, and M10A6 configurations only.		
1.	Remove electrical connector (1) from housing (2).		
2.	Using multimeter, check that resistance between housing (2) and plug (3) is 6±.5 ohms.	Faulty light assembly.	a. Replace lamp (TM 20-2) b. Disassemble light assembly and check for worn, corroded, or broken parts and replace (Vol II, para 4-15).
3.	Install connector (1) in light assembly housing (2).		
	NOTE FOLLOW-ON MAINTENANCE Correct remaining faults listed on DA Form 2404. Do final inspection (Vol II, para 5-2). END OF TASK		

2-2. PERFORMANCE TEST (CONT)



TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

VOLUME II - MAINTENANCE

BALLISTICS DRIVE:
M10

M10A1

M10A3

M10A4

M10A5

M10A6

CHAPTER 1

INTRODUCTION

Section 1. GENERAL

1-1. SCOPE

This volume contains maintenance requirements and procedures for direct support and general support (DS/GS) maintenance for the M10 Series Ballistic Drive. See Volume I for troubleshooting Procedures.

1-2. ORGANIZATION

a. Chapter 2, General Maintenance Information, lists the maintenance items and references other procedures that are necessary to do the maintenance in this manual.

b. Chapter 3, Inspection Upon Receipt, gives the kind of defects to look for when the ballistics drive is returned to DS/GS. A complete inspection should be made and faults listed on DA Form 2404 before any repairs are made.

c. Chapter 4, Maintenance Procedures, gives step-by-step procedures to repair faults found during inspection of troubleshooting.

d. Chapter 5, Final Inspection, gives procedures to be done after repair to make sure that the ballistics drive works.

e. Chapter 6, Packaging, gives procedures for packaging the ballistics drive for storage or shipment.

f. Appendix A, Expendable Supplies and Materials List, lists the supplies and materials needed to repair the ballistics drive.

g. Appendix B, Maintenance Task Index, helps you find the necessary maintenance tasks for the ballistics drive.

h. Appendix C, Fabricated Tools, gives drawings with dimensions and use of each tool, so you can have the tools made.

Section 2. DESCRIPTION AND DATA

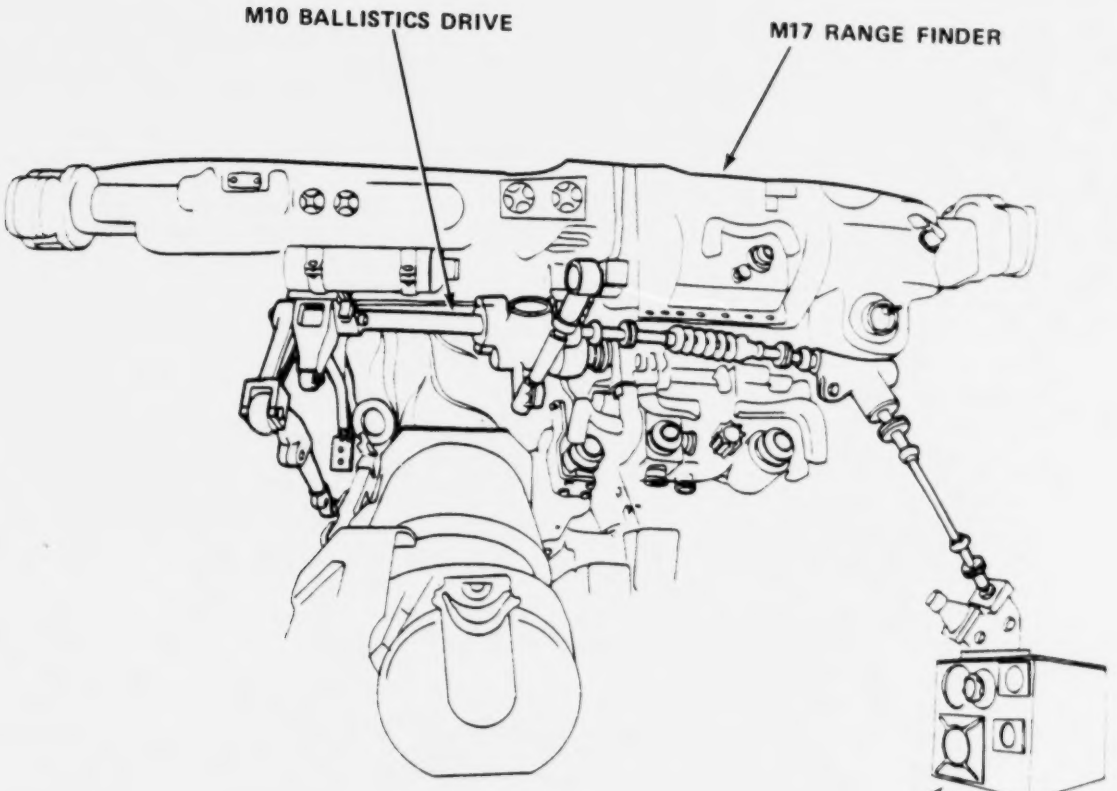
1-3. DESCRIPTION

The ballistics drive makes the range finder, gunner's periscope and ballistic computer all work together as a sighting system. The drive lowers the lines-of-sight of the range finder and periscope according to the superelevation data, which is fed to the drive by the computer output shaft. It makes the linkage to the range finder and the coupling to the gunner's periscope turn. This lowers the lines-of-sight of the range rinder and periscope the right number of mils of superelevation. To again sight the target, the gun must be raised an amount equal to the superelevation angle. The drive link assembly is a solid mechanical linkage that keeps the optical line-of-sight of the range finder and periscope synchronized with line-of-sight through the axis of the gun bore. The drive is belted to pads on the turret roof. The junction box assembly is attached to a bracket near the periscope mount. The drive has a trunnion link for connecting to the gun trunnion, a range finder connector assembly for connecting to the range finder, and a temperature compensating rod with a rod mounting bracket which bolts to a pad inside the turret wall. The drive also has a superelevation box assembly and level vial.

1-4. TABULATED DATA

Data	M10	M10A1	M10A3	M10A4	M10A5	M10A6
Length (inches)	55	55	39	55	55	55
Width (inches)	45	45	25	45	45	45
Height (inches)	30	31	14	31	31	31
Weight (pounds)	155	155	140	147	147	155

1-4. TABULATED DATA (CONT)



VIEW LOOKING TOWARDS FRONT OF TANK

1-5. DIFFERENCES BETWEEN CONFIGURATIONS

When needed for doing a task, the differences between ballistics drive configurations will be given in the maintenance procedures. The differences between the configurations which can be seen are shown below.

a. Ballistics drive M10

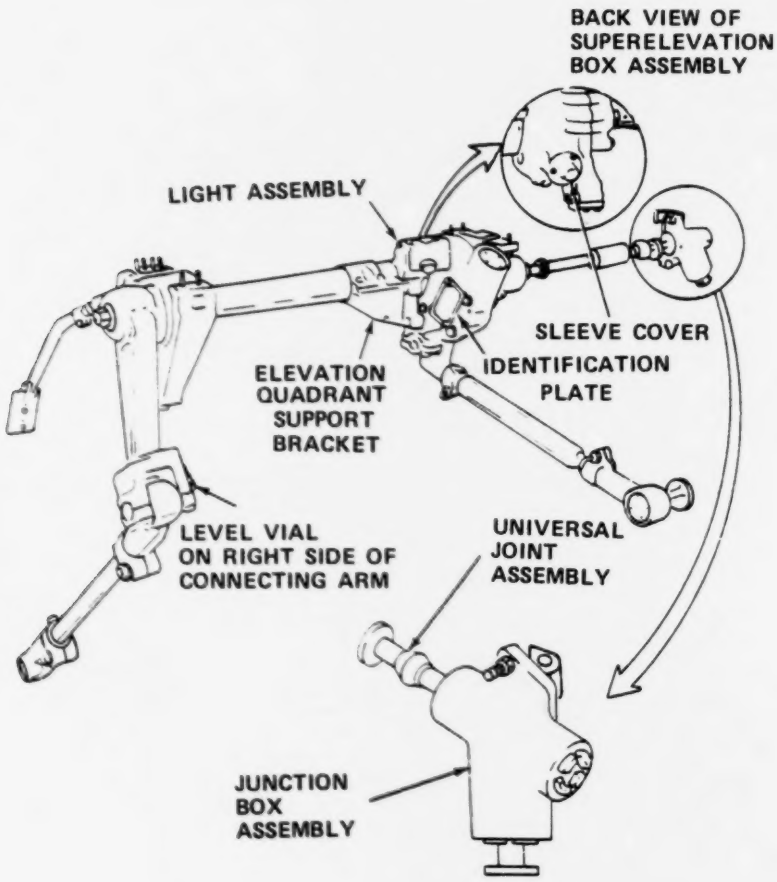
(1) Has a support bracket for elevation quadrant M13A1.

(2) Level vial on right side of connecting arm

(3) Identification plate marking.

(4) Has a light assembly clamped to the cross shaft assembly.

(5) Has junction box assembly, M10A3 does not.



1-5. DIFFERENCES BETWEEN CONFIGURATIONS (CONT)

b. Ballistics drive M10A1.

(1) Has a support bracket for elevation quadrant M13A1.

(2) Level vial on right side of connecting arm.

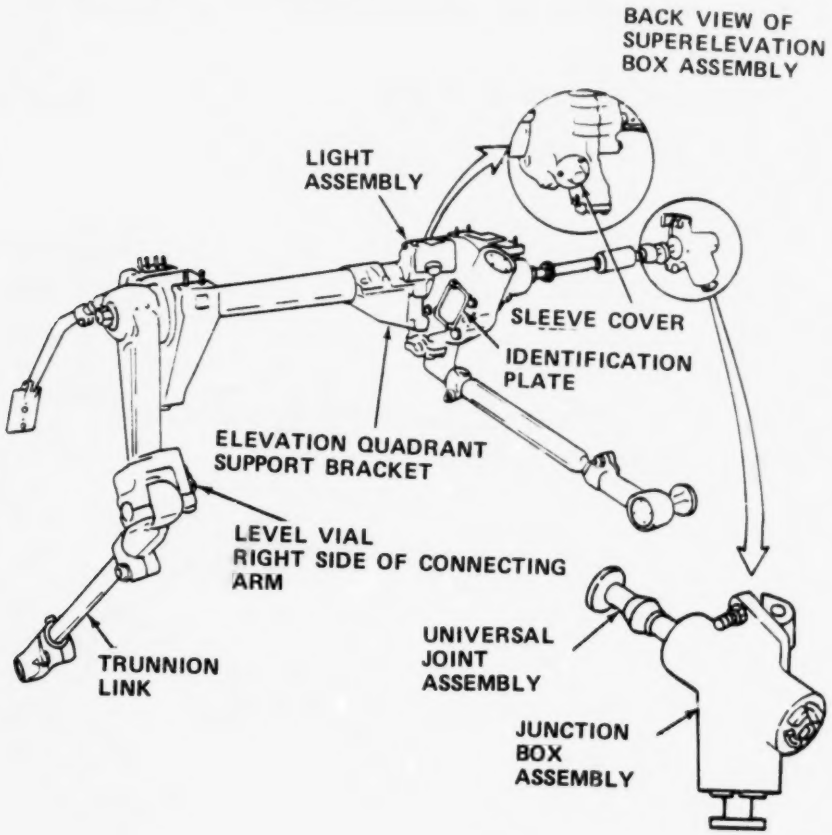
(3) Has shorter cross shaft assembly than M10 to accommodate IR Periscope M32.

(4) Has same trunnion linkage as M10.

(5) Identification plate marking.

(6) Has a light assembly clamped to the cross shaft assembly.

(7) Has junction box, M10A3 does not.



1-5. DIFFERENCES BETWEEN CONFIGURATIONS (CONT)

c. Ballistics drive M10A3.

(1) Has no quadrant support bracket.

(2) Level vial on right side of connecting arm.

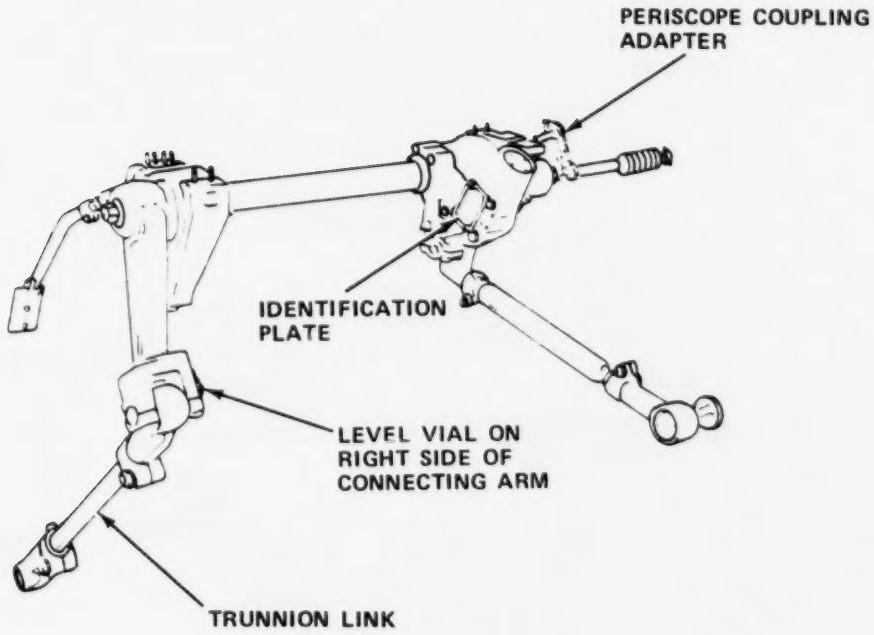
(3) Has no light assembly.

(4) Has longer trunnion linkage than M10 or M10A1.

(5) Has no junction box or bracket.

(6) Has shorter cross shaft assembly than M10A4 to accommodate IR Periscope M32 or M35.

(7) Has same length trunnion linkage as M10A4.



1-5. DIFFERENCES BETWEEN CONFIGURATIONS (CONT)

d. Ballistics drive M10A4.

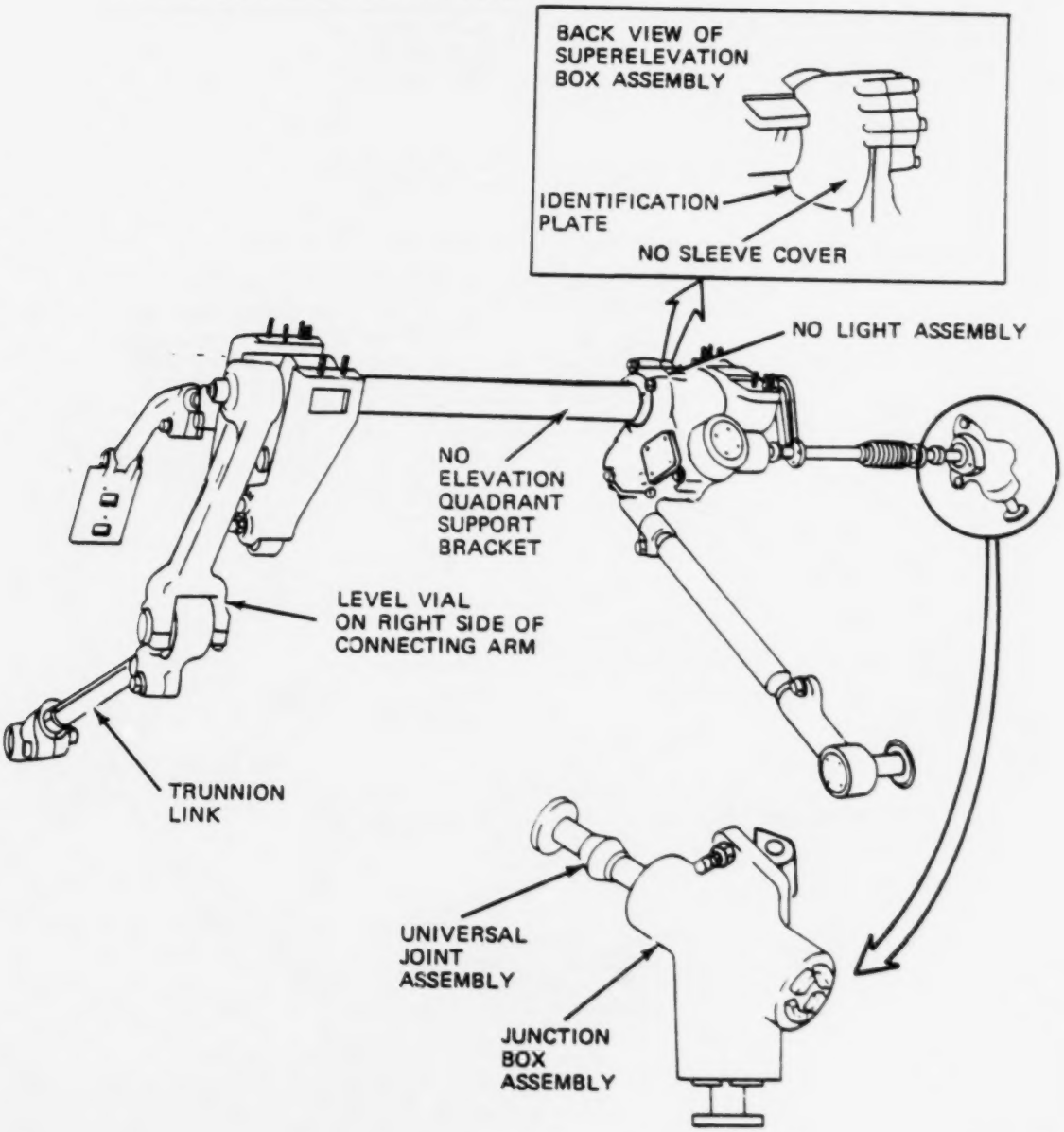
(1) Does not have a quadrant support bracket.

(2) Level vial on right side of connecting arm.

(3) Has no light assembly.

(4) Identification plate marking.

(5) Longer trunnion link than M10.



1-5. DIFFERENCES BETWEEN CONFIGURATIONS (CONT)

e. Ballistics drive M10A5.

(1) Has no quadrant support bracket.

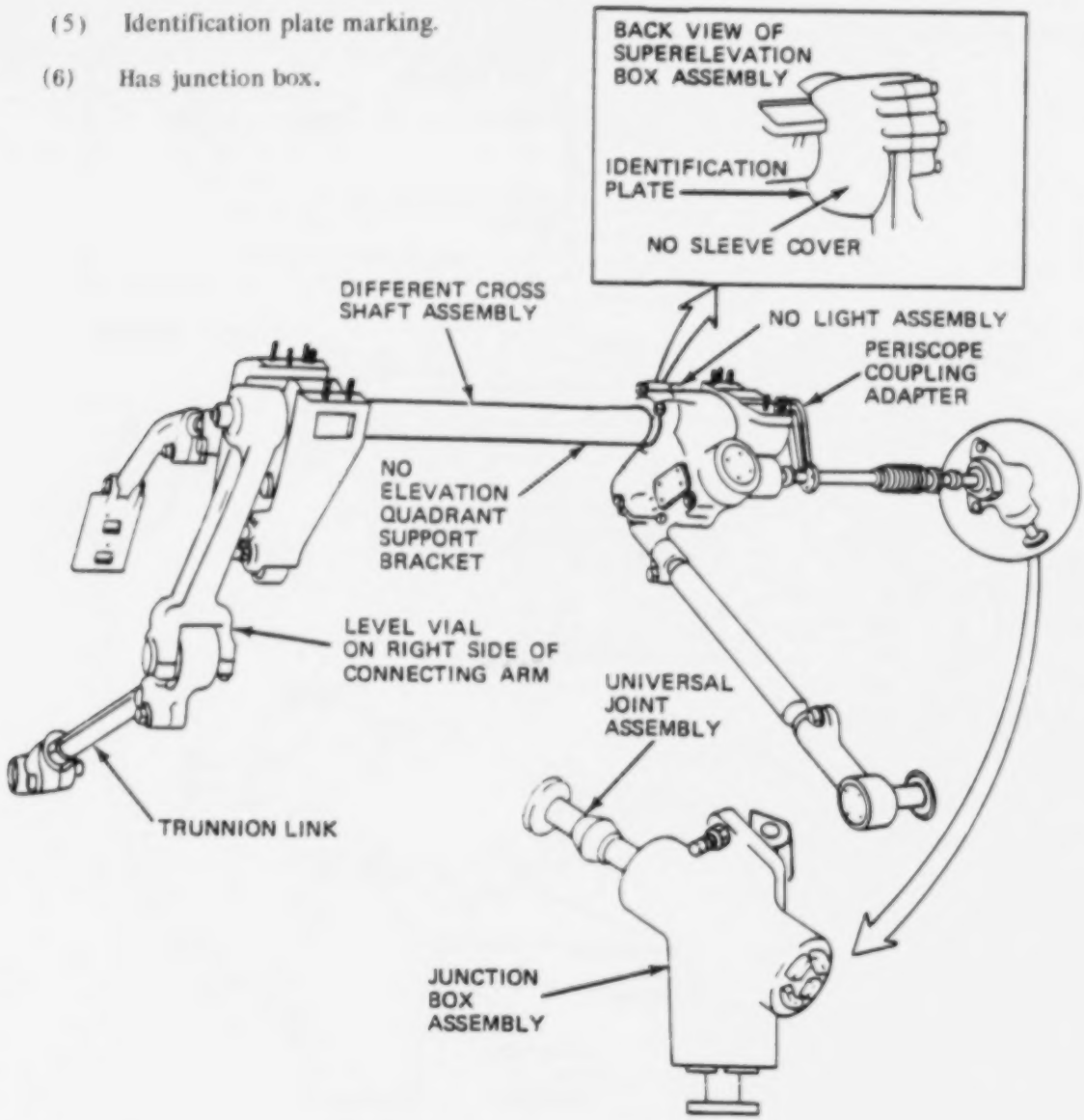
(2) Level vial on right side of connecting arm.

(3) Has shorter cross shaft assembly than M10A4 to accommodate IR Periscope M32 or M35.

(4) Has same length trunnion link as M10A4.

(5) Identification plate marking.

(6) Has junction box.



1-5. DIFFERENCES BETWEEN CONFIGURATIONS (CONT)

f. Ballistics drive M10A6.

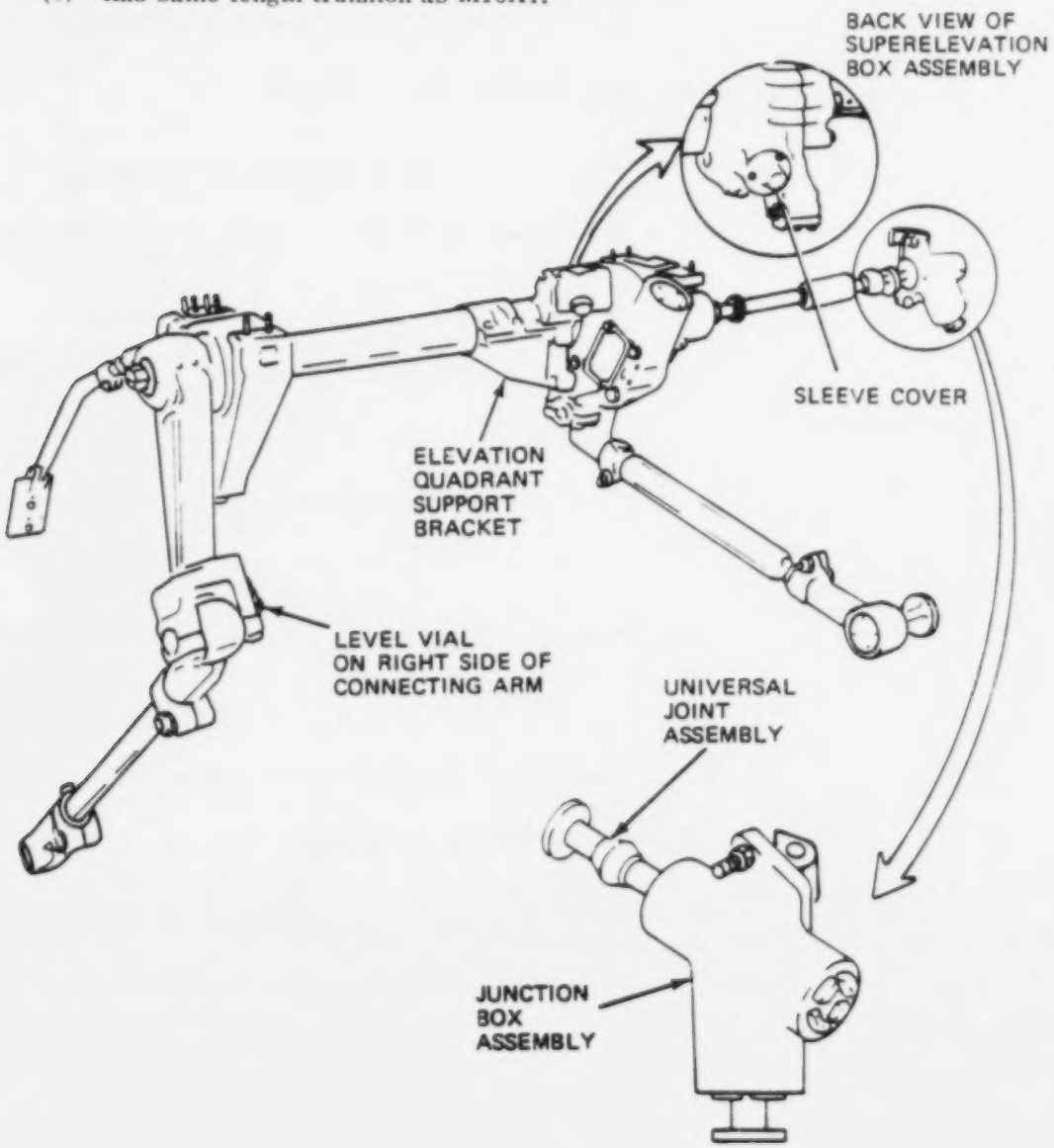
(1) Has quadrant support bracket.

(2) Identification plate marking.

(3) Has a light assembly clamped to the cross shaft assembly.

(4) Has junction box.

(5) Has same length trunnion as M10A4.


BACK VIEW OF SUPERELEVATION BOX ASSEMBLY
SLEEVE COVER
ELEVATION QUADRANT SUPPORT BRACKET
LEVEL VIAL ON RIGHT SIDE OF CONNECTING ARM
UNIVERSAL JOINT ASSEMBLY
JUNCTION BOX ASSEMBLY

CHAPTER 2

GENERAL MAINTENANCE INFORMATION

Section 1. GENERAL

2-1. SCOPE

This chapter tells you where to find general information and what special tools and test equipment are needed for the M10 Series Ballistics Drive.

Section 2. REFERENCE DOCUMENTS

2-2. GENERAL MAINTENANCE

General Maintenance procedures for fire control materiel are in TM 9-254 and Job Performance Guide 113-091-9000R (JPG 41C).

2-3. CLEANING

General cleaning procedures are in JPG 41C.

2-4. PAINTING

General painting procedures are in TM 43-0139.

2-5. SEALING

General instructions for how to use sealing compound are in JPG 41C.

2-6. LUBRICATION

General instructions for how to use lubricants are in JPG 41C.

Section 3. SAFETY PROCEDURES

2-7. GENERAL PROCEDURE

General safety procedures are in AR 385-40 safety: Accident Reporting and Records.

Section 4. SPECIAL TOOLS AND TEST EQUIPMENT

2-8. TOOLS AND TEST EQUIPMENT

There are no special tools or test equipment needed to repair the M10 Series Ballistics Drive at direct support and general support.

CHAPTER 3

INSPECTION UPON RECEIPT

3-1. SCOPE

This chapter gives procedures to check the M10 Series Ballistics Drive for faults you can see when it is received in the DS/GS shop. It also tells you what part of this volume to go to for various repairs. A complete inspection should be made and all faults listed on DA Form 2404 before taking any maintenance actions. The performance test in Volume I, Chapter 2, should be done after doing the inspection upon receipt.

3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT

TOOLS: 1/4", 3/16" flat tip screwdriver
7/16", 1/2", 9/16", 3/4", 15/16", 1-1/16", 1-1/8" open end wrench
5/64" socket head screw key (Allen wrench or equivalent)
3/8" drive ratchet wrench
5/16" hexagon stud socket (3/8" drive)
6" extension (3/8" drive)
3/8" universal joint
0.075" to 0.085" adjustable face spanner wrenchs

SUPPLIES: Paint (item 3, App A)
5/16" x 5/16" x 1" square stock.

PERSONNEL: One

REFERENCES: JPG 41C for completing DA Form 2404
TM 43-0139 for painting
TM 9-254 for general maintenance

EQUIPMENT CONDITION: Ballistic drive mounted on vehicle, except for inspection items marked with an asterisk (*). These items can be checked properly only with ballistics drive or subcomponents removed from vehicle.

NOTE

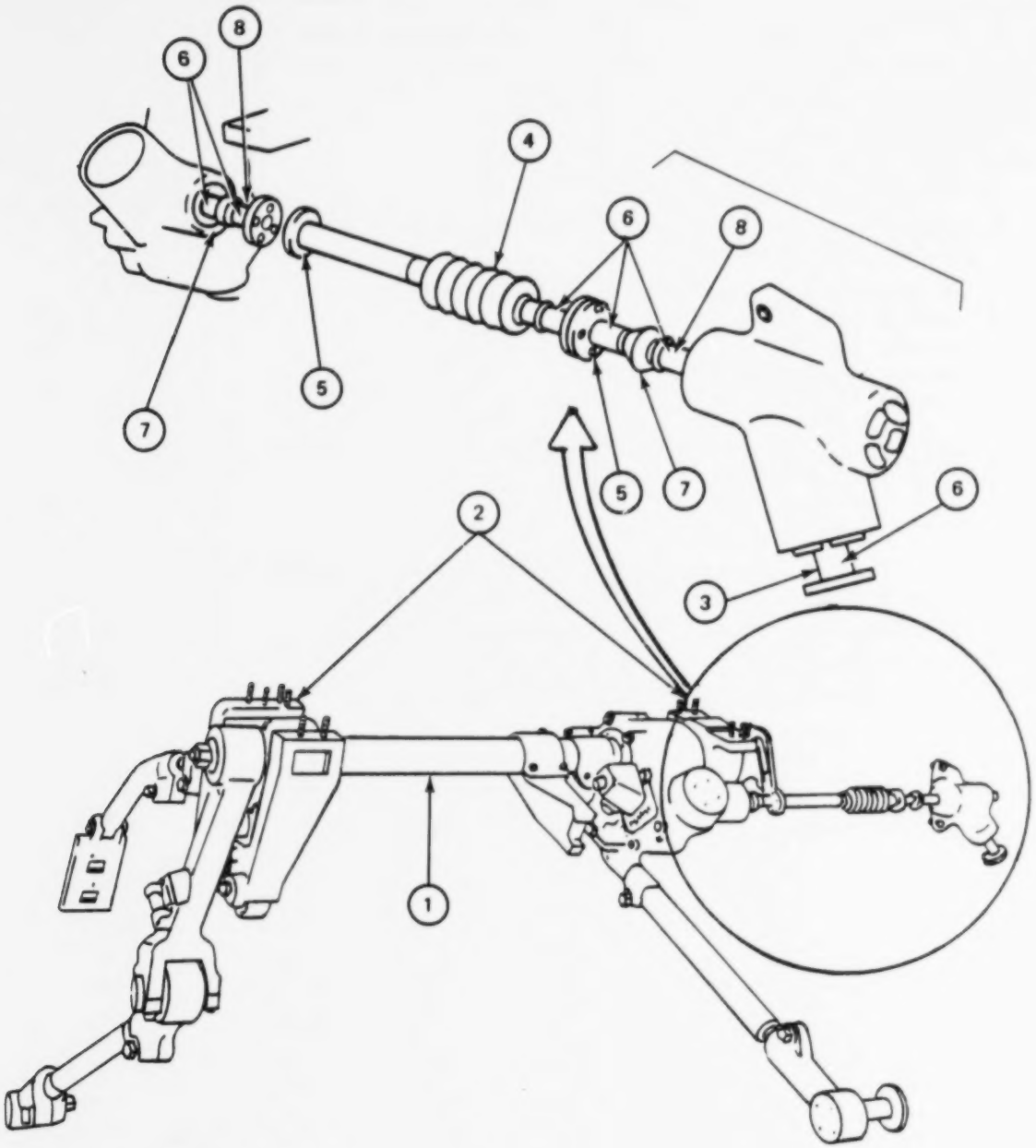
Once the ballistics drive is removed from vehicle DS/GS does not have the tools to accurately set the fire control level if the level is tampered with. If the fire control level needs to be repaired, repair before removing ballistics drive from vehicle.

3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)

FRAME 1

Step	Procedure	Maintenance Action	Reference
1.	Check ballistics drive for bent, broken, or damaged parts.	If cracks or dents are found, tell your supervisor.	. . .
2.	Check ballistics drive for missing parts.	If parts are missing, tell your supervisor.	. . .
3.	Check ballistics drive for chipped or scratched paint.	Paint chipped or scratched areas.	TM 43-0139
4.	Check ballistics drive for dirt and corrosion.	Clean ballistics drive.	JPG 41C
5.	Check for lateral movement of cross shaft assembly (1) in the left and right support assemblies (2).	If there is movement, send ballistics drive to depot for repair.	. . .
6.	Check rubber boot (4) for cracking and breaking.	Replace boot.	Para 4-28
7.	Using 3/16" screwdriver, check that eight screws (four screws for M10A3) (5) are tight.	Replace if missing.	. . .
8.	Check that five pins (three pins for M10A3) (6) are not missing.	Replace if missing.	Para 4-23 or 4-28
9.	Check two rubber covers (one rubber cover for M10A3) (7) on universal joints (8) for cracking and breaking. GO TO FRAME 2	Replace universal joint if damaged.	Para 4-23

3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)

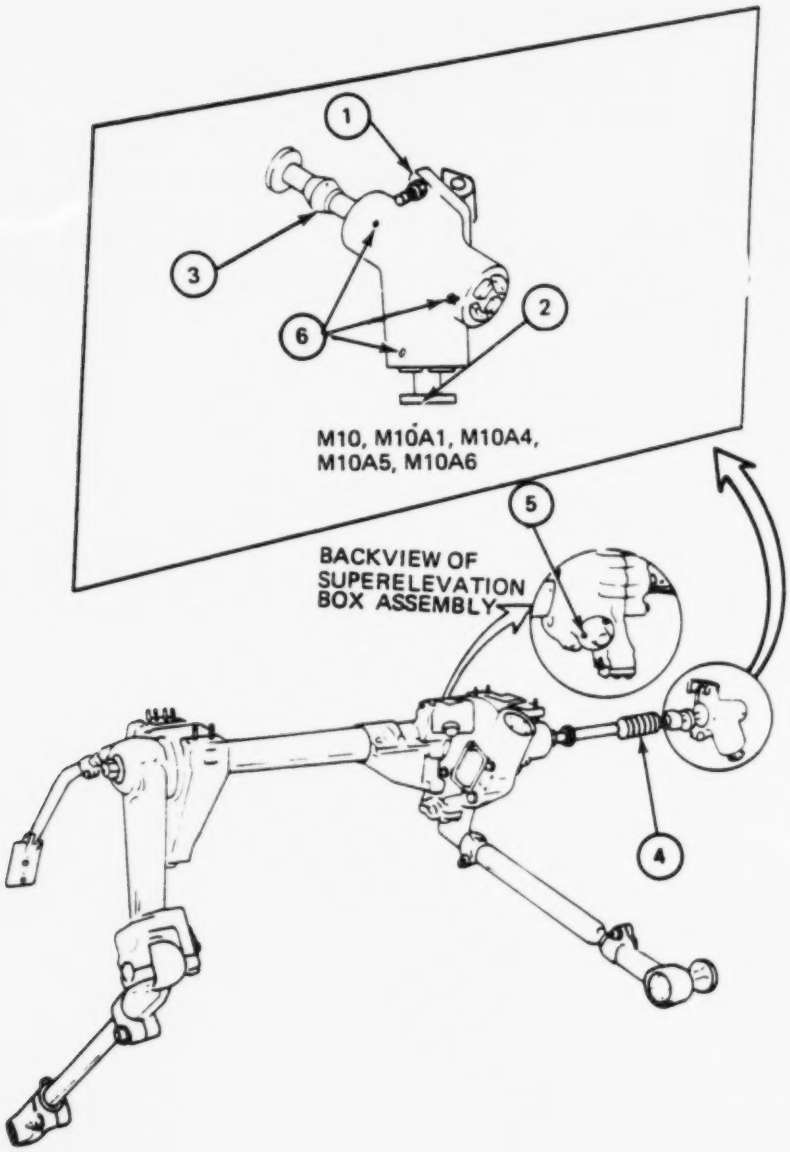


3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)

FRAME 2

Step	Procedure	Maintenance Action	Reference
	NOTE If the M10A3 unit is being inspected, go to frame 3.		
1.	Using 1/2"open end wrench, check that two screws (1) are tight.	Tighten. Replace if missing.	. . .
2.	Check that junction box input shaft (2) turns freely when universal joint (3) is disconnected from shaft assembly (4).	Adjust junction box.	Para 4-4, frame 4, step 1, frame 5, step 1.
3.	(M10, M10A1, M10A6, only) Using 1/4" screwdriver check that three screws (5) are tight.	Tighten. Replace if missing.	. . .
4.	Using 5/64" Allen wrench, check that three setscrews (6) are tight. GO TO FRAME 3	Tighten. Replace if missing	. . .

3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)

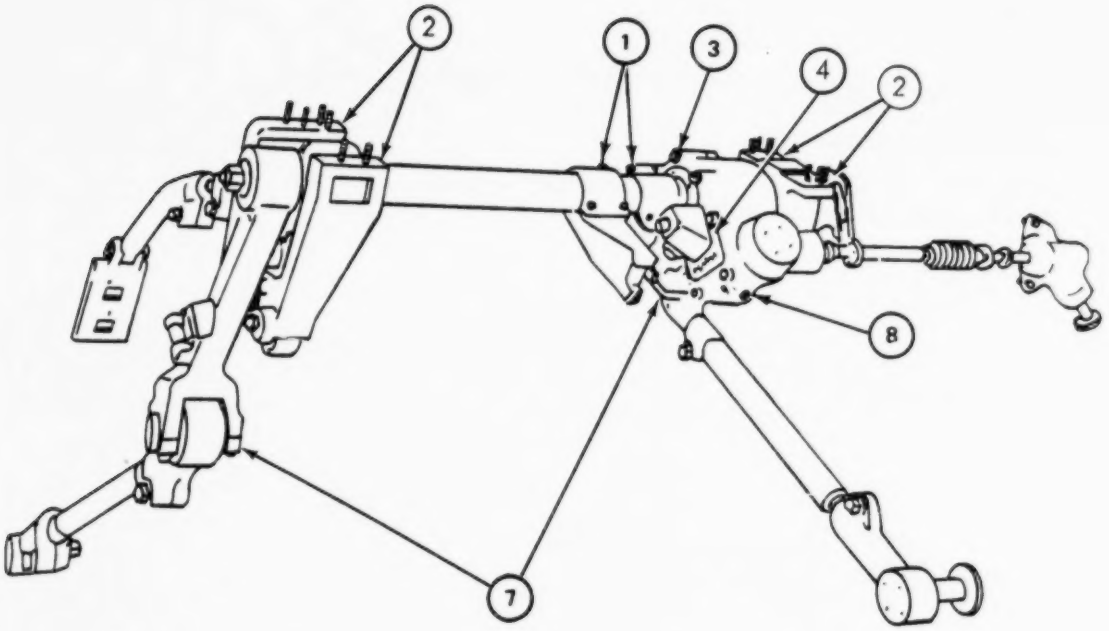


3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)

FRAME 3

Step	Procedure	Maintenance Action	Reference
1.	(M10, M10A1, M10A6 only) Using 7/16" open end wrench, check that eight screws (1) are tight.	Tighten or replace if missing.	. . .
2.	Check surfaces of two mounting supports (2) for nicks or burrs.	Remove, nicks or burrs.	. . .
3.	Using 9/16" open end wrench, check that eight screws (3) are tight.	Tighten. Replace if missing.	. . .
4.	Using 1/4" screwdriver, check that four screws (4) are tight.	Tighten. Replace if missing.	. . .
5.	Using 1/2" open end wrench, check that eight screws (7) are tight.	Tighten. Replace if missing.	. . .
6.	Using 5/16" square stock, 1" long, with 3/8" socket and extension and rachet, check that two plugs (8) are tight.	Tighten plug.	. . . .
	GO TO FRAME 4		

3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)

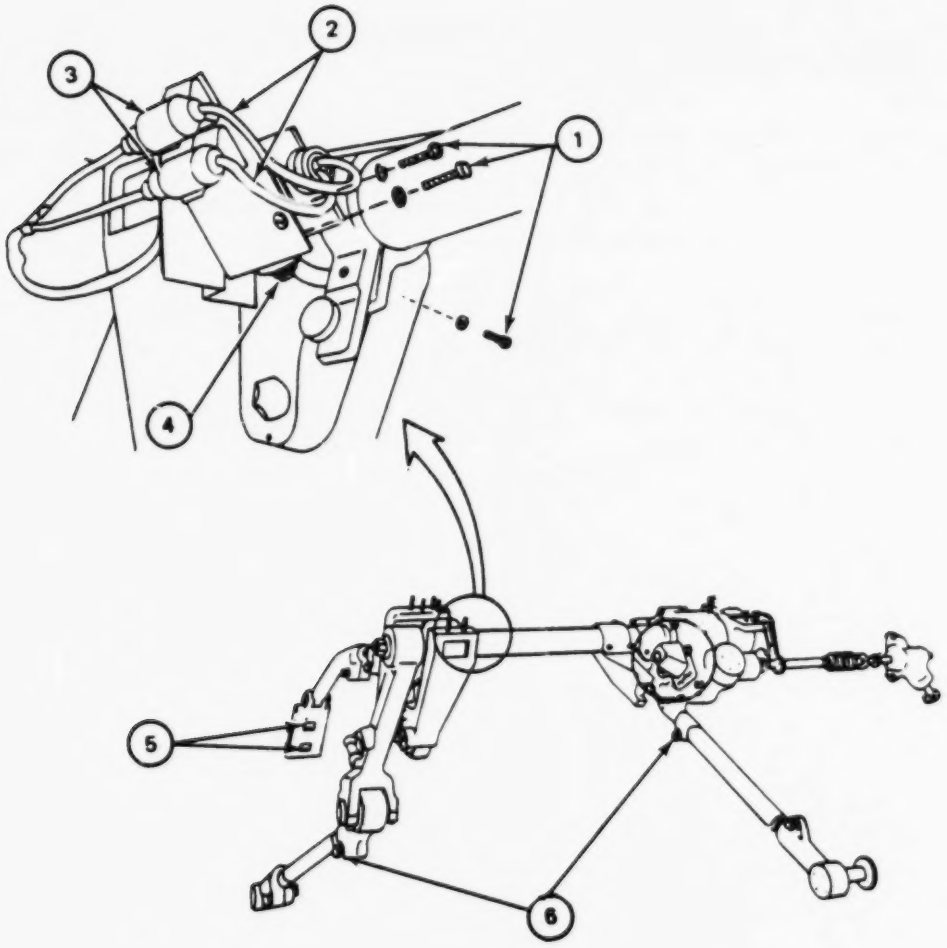


3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)

FRAME 4

Step	Procedure	Maintenance Action	Reference
1.	Using screwdriver and 7/16" open end wrench, check that three screws (1) are tight.	Tighten. Replace if missing.	. . .
2.	Check that electrical wires (2) and connectors (3) on interference switch (4) are not damaged.	Tell your supervisor.	. . .
3.	Using 9/16" open end wrench, check that two screws (5) are tight.	Tighten. Replace if missing.	. . .
4.	Using 3/4" open end wrench, check that four screws (6) are tight.	Tighten. Replace if missing.	. . .
			. . .
	GO TO FRAME 5		

3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)

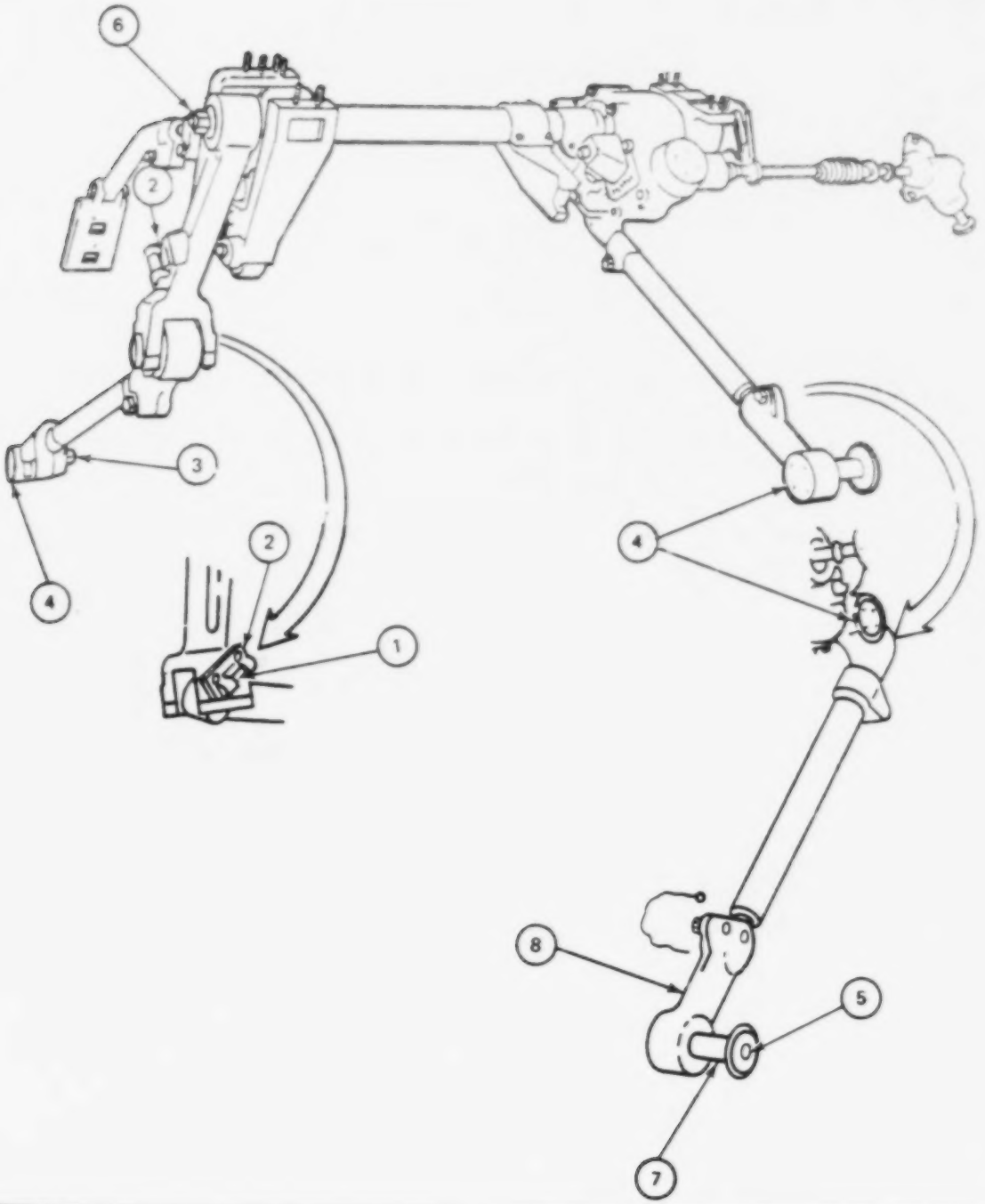


3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)

FRAME 5

Step	Procedure	Maintenance Action	Reference
1.	Check that fire control level (1) is not damaged.	Repair fire control level	Para 4-12
2.	Using 1/4" screwdriver, check that two screws (2) are tight.	Tighten. Replace if missing.	. . .
3.	Using 15/16"open end wrench, check that nut (3) is tight.	Tighten. Replace if missing.	. . .
4.	Using 7/16" open end wrench, check that screw (5) is tight.	Tighten. Replace if missing.	. . .
5.	Using 1 1/16"open end wrench, check that nut (6) is tight.	Tighten. Replace if missing.	. . .
6.	Check that stud (7) turns freely without binding.	If binding, replace rear connector assembly (8).	Para 4-21, frame 1
	GO TO FRAME 6		

3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)

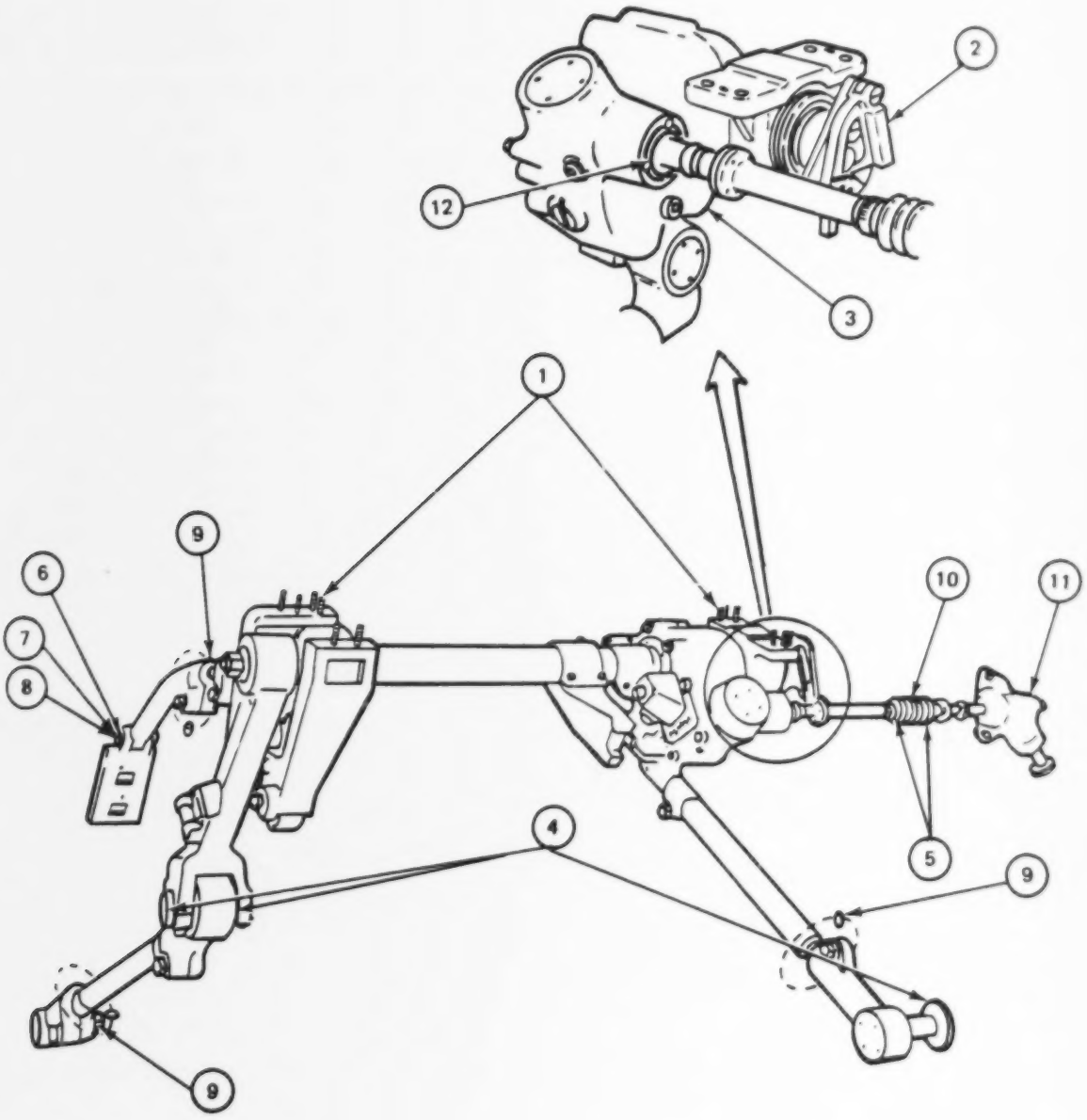


3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)

FRAME 6

Step	Procedure	Maintenance Action	Reference
1.	Using 5/16" stud socket and ratchet, check that eight screws (1) are tight.	Tighten. Replace if missing.	. . .
2.	Check coupling assembly (2) for damage.	Send ballistics drive to depot.	. . .
3.	Check that qualilfying plate (12) can be read.	Clean. If still not able to read, tell your supervisor.	JPG 41C
4.	Check that scales on spindle, sleeve or cap (4) can be read.	Clean. Replace if necessary.	JPG 41C Para 4-9 Para 4-20
5.	Check that two clamps (5) are tight.	Replace clamps if necessary.	Para 4-28
6.	Check that cotter pin (6) and washer (7) are installed on pin (8).	Replace missing or damaged parts.	Para 4-6
7.	Check that three wire seals (9) are installed.	Replace missing wire seals, if installed in vehicle.	Para 4-5, frame 3, steps 3 and 7 and frame 7, steps 3 and 7 and frame 12 steps 2 and 6
8.	Separate input shaft (10) from junction box assembly (11).	. . .	Para 4-4, frame 5, step 1.
9.	Check that input shaft (10) of superelevation box assembly (12) turns freely without binding.	Send ballistics drive to depot for repair.	. . .
10.	Connect input shaft (10) to junction box assembly (11) (electronic computer for M10A3). **NOTE** FOLLOW-ON MAINTENANCE Correct faults listed on DA Form 2404 that may affect performance test. Do performance test (Vol I, para 2-2). END OF TASK	. . .	Para 4-5, frame 8, step 2.

3-2. BALLISTICS DRIVE INSPECTION UPON RECEIPT (CONT)



CHAPTER 4
MAINTENANCE PROCEDURES

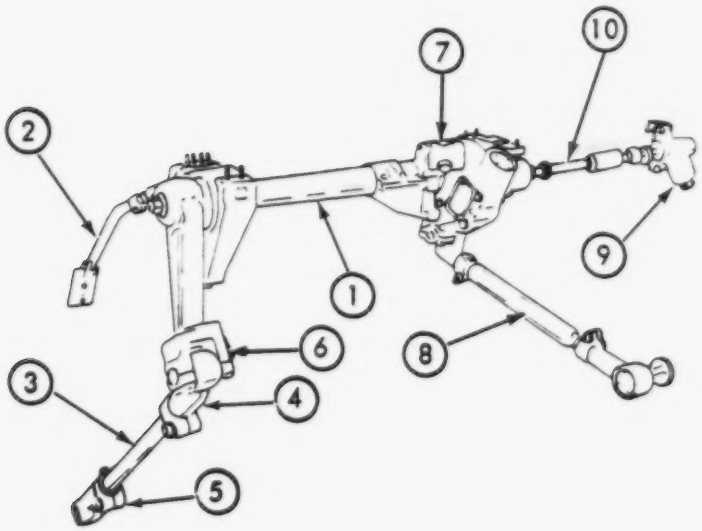
Section 1. GENERAL

4-1. SCOPE

This chapter gives maintenance procedures for the M10 Series Ballistics Drive.

4-2. LIST OF BALLISTICS DRIVE ITEMS CONTAINED IN THIS CHAPTER

Item	Figure Index No.	Reference (para)
Ballistics Drive	1	4-3
Temperature Compensating Rod	2	4-6
Trunnion Link	3	4-9
Drive Connector	4	4-12
Link Connector	5	4-15
Fire Control Level	6	4-18
Light Assembly	7	4-21
Rangefinder Link Connector Assembly	8	4-26
Junction Box Assembly	9	4-29
Shaft and Related Parts	10	4-34



Section 2. BALLISTICS DRIVE

4-3. BALLISTICS DRIVE MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	4-4
Installation	4-5

4-4. BALLISTICS DRIVE REMOVAL

TOOLS: 3/16" flat tip screwdriver
#3 cross tip screwdriver (Phillips type)
6" extension (3/8" drive)
3/8" drive universal joint
3/8" drive ratchet wrench
1/2", 3/4", and 1 1/16" open end wrench
5/16", 7/16 ", 1/2", 9/16" and 15/16" box end wrench
5/16"hexagon stud socket (3/8 drive)

SUPPLIES: 2" by 4" by 4" wooden block

PERSONNEL: Three Repairman A: Holds ballistics drive and removes hardware
Repairman B: Disconnects hardware
Repairman C: Helps in removal of ballistics drive

REFERENCES: TM 20-2 for: Removing M13A1 elevation quadrant
Removing M32 (or M35) gunner's periscope
(TM 9-2350-215-20-2 for M60A1, TM 9-2350-257-20-2 for M60A1 Rise, and TM 9-2350-260-20-2 for M60)

EQUIPMENT CONDITION: Vehicle parked, vehicle MASTER SWITCH off, gun level

PRELIMINARY PROCEDURES: For ballistics drive M10, M10A1, M10A3, and M10A6 remove M13 series elevation quadrant (TM 20-2)
Remove M32 (or M35) gunner's periscope (TM 20-2)

NOTE

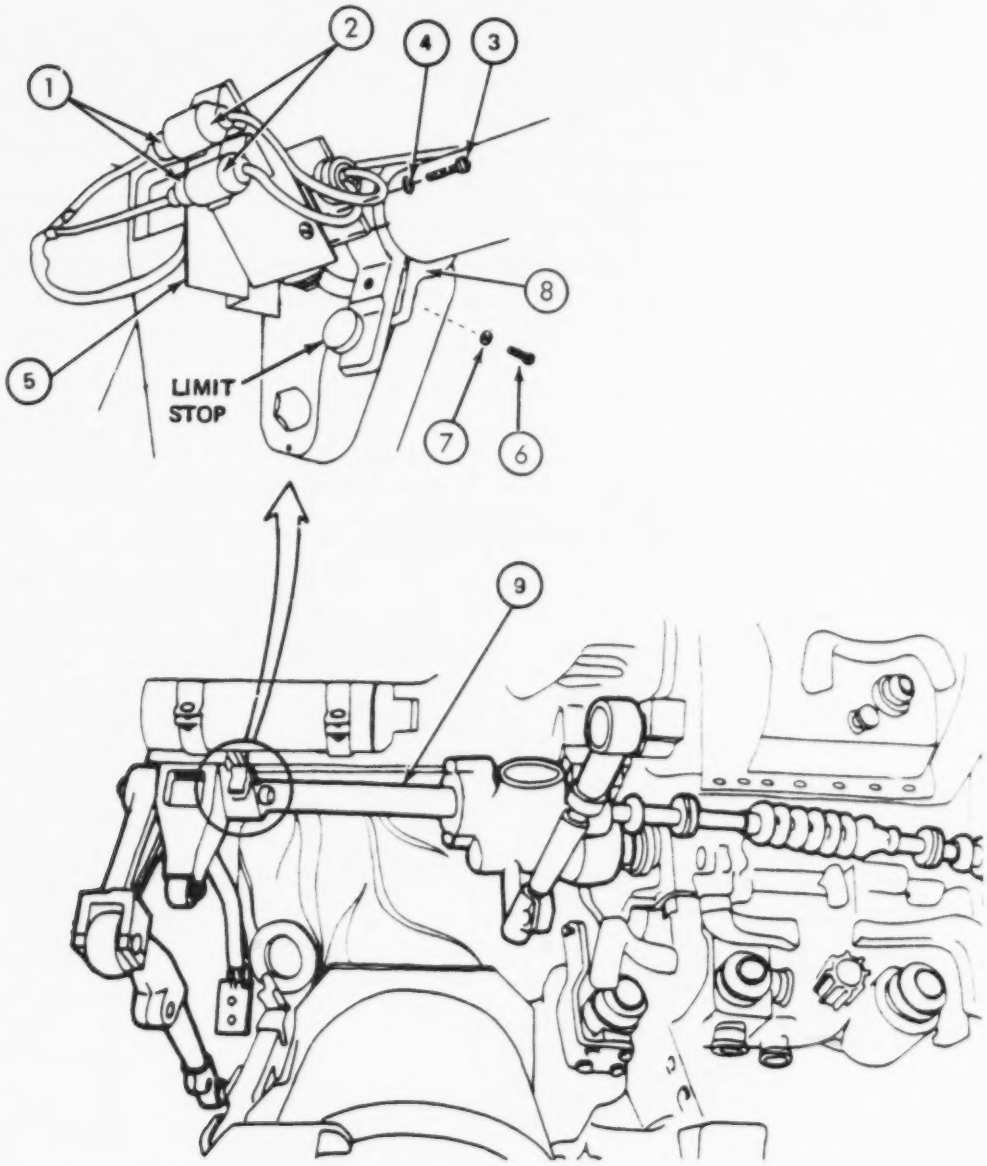
When a step is to be done for only some of the ballistics drive models, the models will be shown. (M10, M10A1) means the step is only to be done for models M10 and M10A1.

4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 1

Step	Procedure
1.	Disconnect electrical connection (1) from elevation interference switch (2).
2.	Using Phillips screwdriver, remove two screws (3) and two lockwashers (4) holding bracket (5) to ballistics drive.
3.	Remove bracket (5) and switch (2).
4.	Using 7/16" box end wrench, remove one screw (6) and one lockwasher (7). Holding clamp assembly (8) to cross shaft assembly (9).
	NOTE Clamp assembly (8) should remain in vehicle. Clamp assembly (8) is not part of ballistics drive.
5.	Remove clamp assembly (8) with limit stop attached.
	GO TO FRAME 2

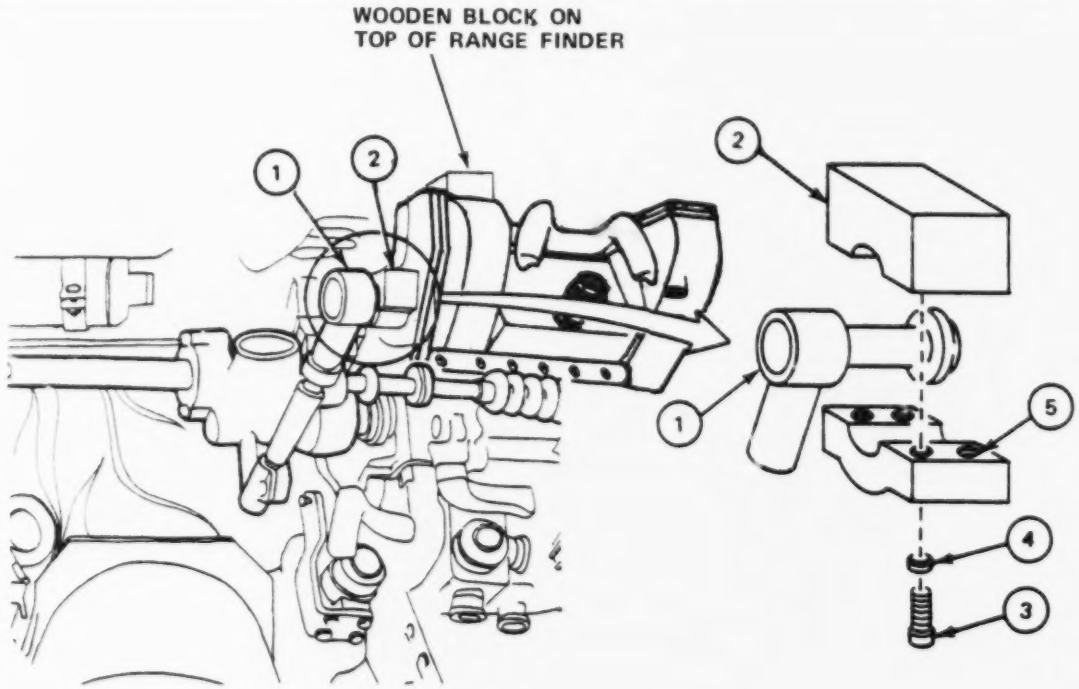
4-4. BALLISTICS DRIVE REMOVAL (CONT)



4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 2

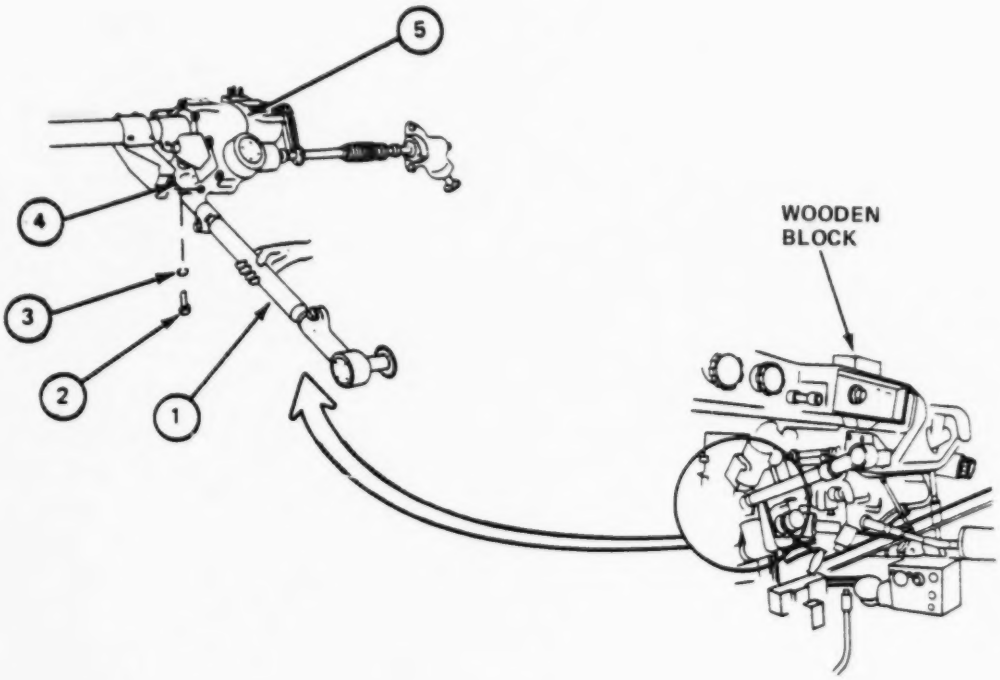
Step	Procedure
	CAUTION Before removing rear connector assembly (1), place a wooden block (2" x 4" x 4") between range finder (2) and turret top so range finder is not damaged.
1.	Using 1/2" box end wrench, remove four screws (3) and four lockwashers (4) holding cap (5) to range finder (2).
2.	Remove rear connector assembly (1) from range finder (2).
3.	Replace cap (5), four lockwashers (4) and four screws (3) on range finder (2) and hand tighten to prevent loss.
	GO TO FRAME 3



4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 3

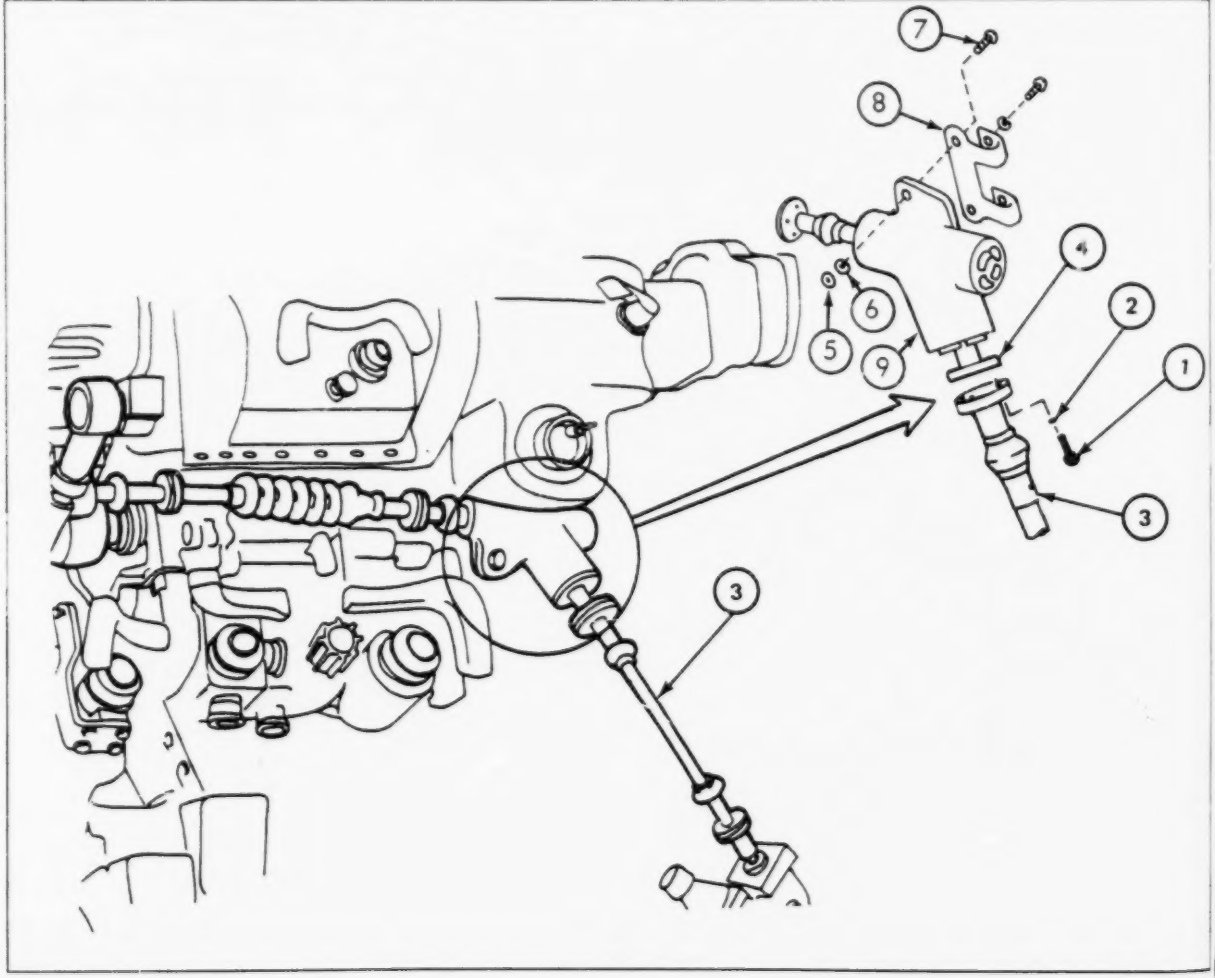
Step	Procedure
1.	Repairman A: hold connector assembly (1). Repairman B: using 1/2" box end wrench, remove four screws (2) and four lockwashers (3) holding cap (4) to superelevation box assembly (5).
2.	Repairman A: remove connector assembly (1).
3.	Replace cap (4), four lockwashers (3), and four screws (2) on superelevation box assembly (5) and hand tighten to prevent loss.
	GO TO FRAME 4



4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 5

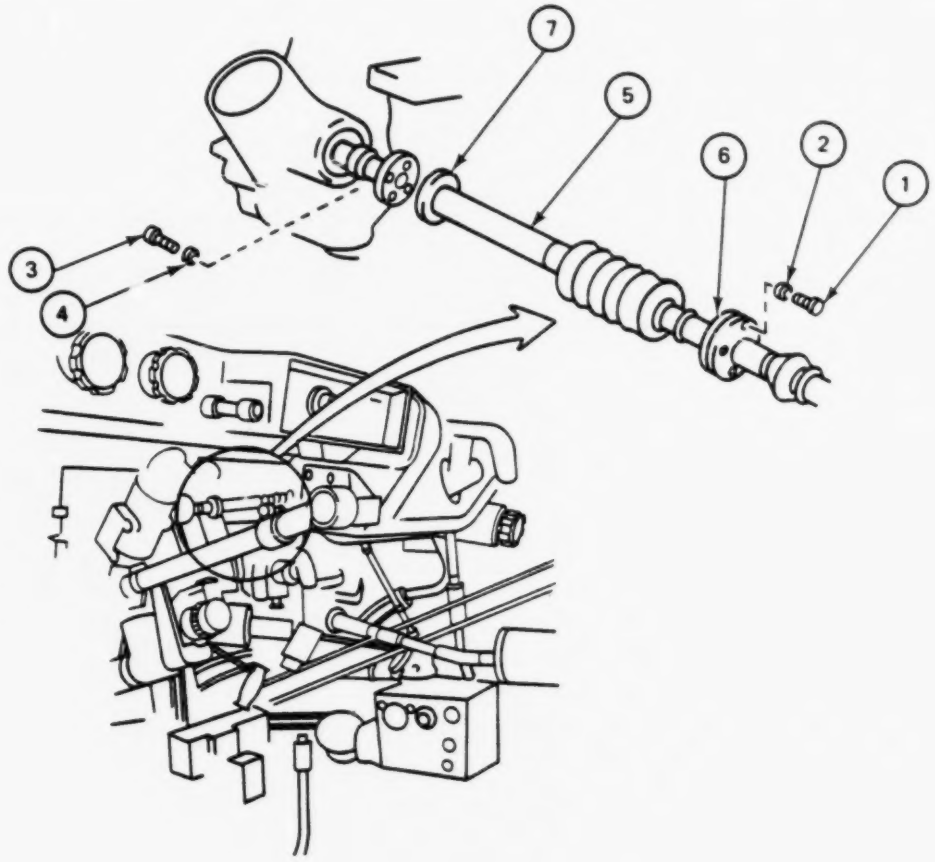
Step	Procedure
1.	Using 3/16" flat tip screwdriver, remove four screws (1) and four lockwashers (2).
2.	Place superelevation drive shaft (3) out of the way.
3.	Replace four screws (1) and four lockwashers (2) in junction box assembly hub (4) and hand tighten to prevent loss.
4.	Remove two nuts (5), two lockwashers (6) and two screws (7) from junction box (9) and bracket (8). Remove junction box and replace two screws, lockwashers and nuts in bracket (8). GO TO FRAME 5



4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 4

Step	Procedure
1.	Using 3/16" flat tip screwdriver, remove four screws (1) and four lockwashers (2).
2.	Using 3/16" flat tip screwdriver, remove four screws (3) and four lockwashers (4).
3.	Remove shaft assembly (5).
4.	Place four lockwashers (2) and four screws (1) in shaft hub (6) and hand tighten to prevent loss.
5.	Place four lockwashers (4) and four screws (3) in shaft hub (7) and hand tighten to prevent loss.
	GO TO FRAME 6

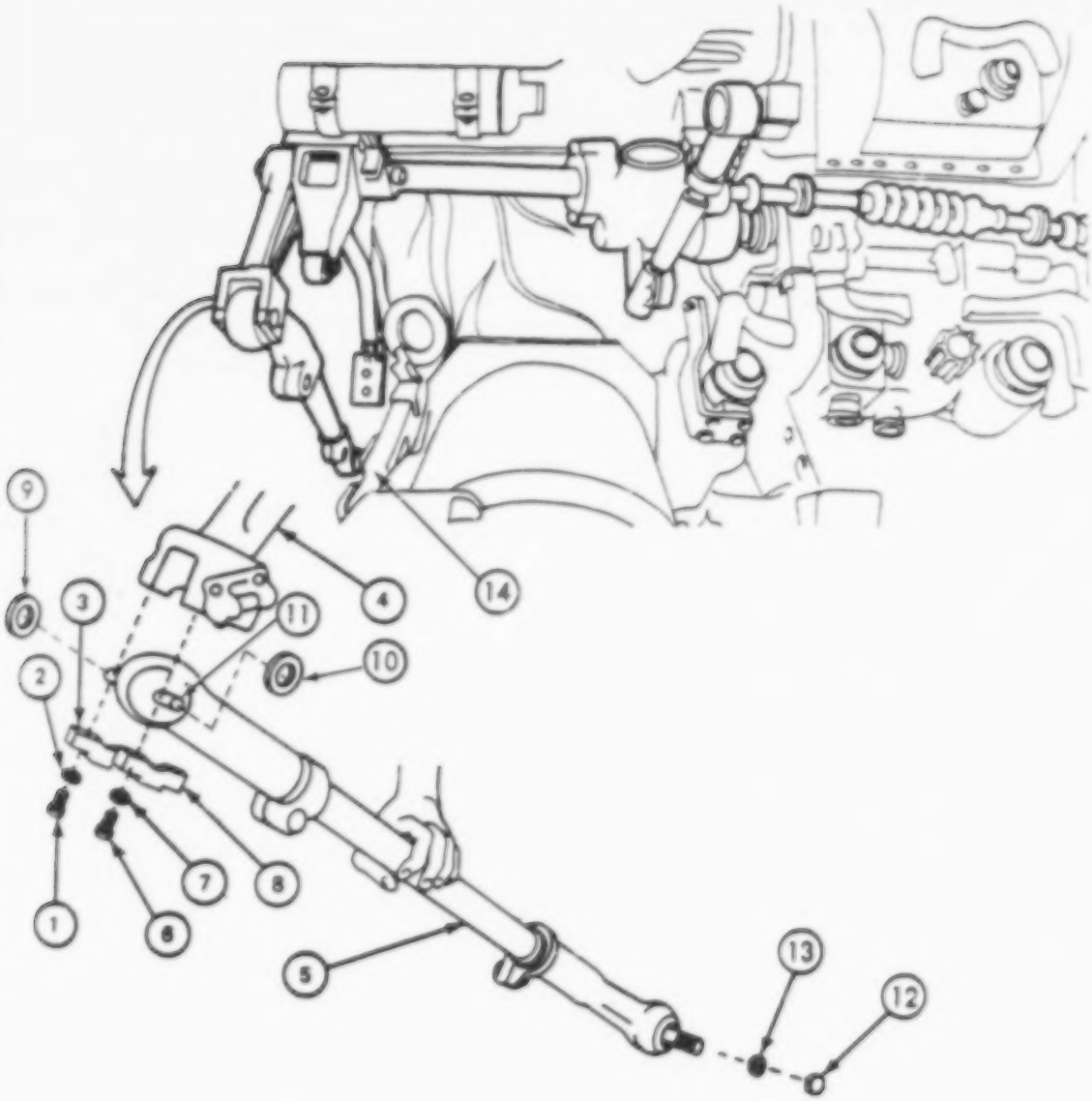


4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 6

Step	Procedure
1.	Using 1/2" box end wrench, remove two screws (1) and two lockwashers (2) holding cap (3) to left support (4).
2.	Repairman A: hold trunnion link (5). Repairman B: using 1/2" box end wrench, remove two screws (6) and two lockwashers (7) holding cap (8) to left support (4).
3.	Repairman B: remove spacers (9 and 10) from spindle (11).
4.	Remove spindle (11) from left support (4).
5.	Place spacers (9 and 10) on spindle and retain spindle and spacers.
6.	Repairman B: using 15/16" box end wrench, remove nut (12) and lockwasher (13) holding trunnion link (5) to trunnion arm (14).
7.	Repairman A: remove trunnion link (5) by tapping with hammer.
8.	Replace two caps (3 and 8) four lockwashers (2 and 7) and four screws (1 and 6) and hand tighten to prevent loss.
9	Replace lockwasher (13) and nut (12) to trunnion link (5) and hand tighten to prevent loss.
	GO TO FRAME 7

4-4. BALLISTICS DRIVE REMOVAL (CONT)

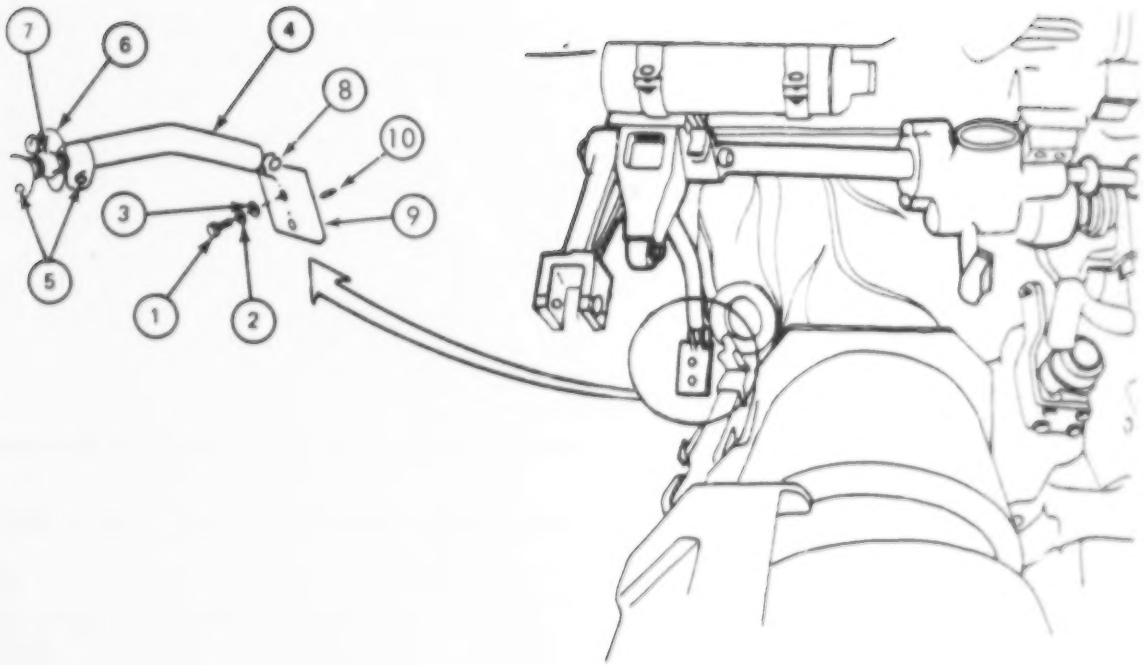


4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 7

Step	Procedure
1.	Using 9/16" box end wrench, remove two screws (1), two lockwashers (2), and flat washers (3) holding temperature compensating rod (4) to turret pad.
2.	Using 3/4" open wrench, loosen two screws (5) and remove wire seal (6) from adjuster (7).
	CAUTION Exercise care when removing bracket (9) to prevent damage to pins (10).
3.	Using pry bar, pry bracket (9) from turret pad while rotating adjuster (7) using 1-1/16" open wrench counter clockwise to free bracket (9) from turret pad and pins (10).
4.	Rotate adjuster (7) clockwise and remove temperature compensating rod (4). GO TO FRAME 8

4-4. BALLISTICS DRIVE REMOVAL (CONT)

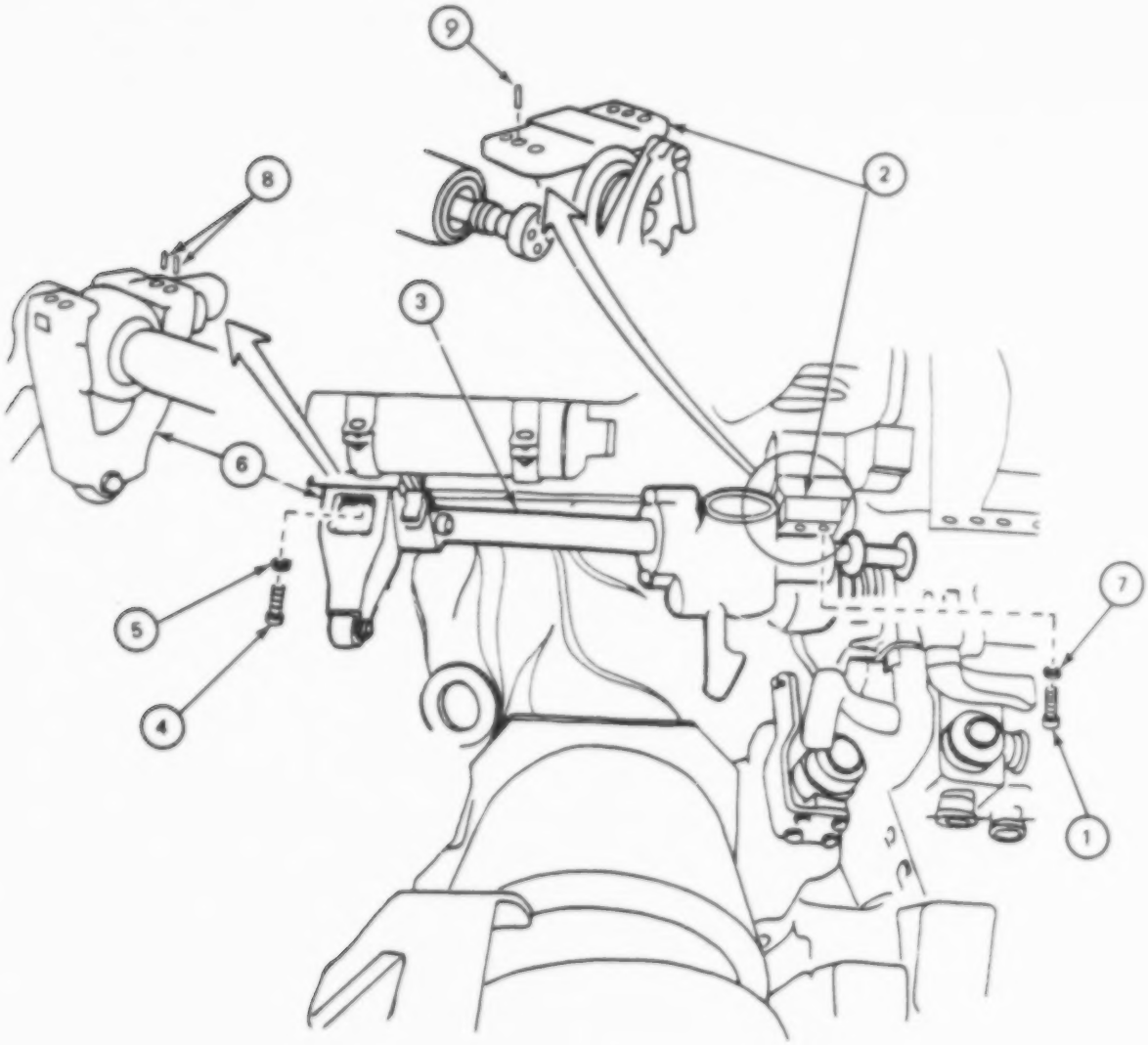


4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 8

Step	Procedure
	WARNING The ballistics drive is heavy and hard to handle. Use care when removing capscrew. Do not drop the ballistics drive because it might hurt someone or cause damage to equipment.
1.	Using 5/16" hexagon stud socket, 6" extension, universal joint and ratchet, loosen - DO NOT REMOVE - four capscrews (1) holding right support (2) to turret mounting pads.
2.	Repairman A and C: hold ballistic drive (3). Repairman B: using 5/16" hexagon stud socket, 6" extension, universal joint, and ratchet, remove four capscrews (4) and lockwashers (5) holding left support (6) to turret mounting pads.
3.	Repairman A and C: hold ballistic drive (3). Repairman B: using 5/16" hexagon stud socket, 6" extension, universal joint, and ratchet, remove four capscrews (1) and four lockwashers (7) holding right support (2) to turret mounting pads.
	CAUTION Using care when removing left and right support assemblies. Slide assemblies simultaneously straight down to prevent damage to locator pins (8 and 9).
4.	Repairman A and C: slowly slide ballistics drive (3) straight down to remove from turret mounting pads.
5.	Repairman A and C inside vehicle: carefully hand ballistics drive through loaders hatch to repairman B outside the turret.
	END OF TASK

4-4. BALLISTICS DRIVE REMOVAL (CONT)



4-5. BALLISTICS DRIVE INSTALLATION

TOOLS: 3/16" flat tip screwdriver
#3 cross tip screwdriver (Phillips type)
1/2", 5/16", 7/16", 9/16", and 15/16" box end wrench
1/2", 3/4", and 1 1/16" open end wrench
5/16" hexagon stud socket (3/8" drive)
6" extension (3/8" drive)
3/8" drive ratchet wrench
3/8" drive universal joint
Spacer gauge tool
Torque wrench
4-oz ball peen hammer
Electric drill
15/64" drill bit
Wire cutter tool
Lockwire tool
1/4" reamer

SUPPLIES: Cleaning rag
Alcohol (item 1, App A) or solvent (item 4, App A)

PERSONNEL: Three Repairman A: Holds ballistics drive
Repairman B: Installs hardware
Repairman C: Helps in mounting ballistics drive only

REFERENCES: JPG 41C for: Cleaning mounting surfaces
Torquing
Installing lockwire
Using electric drill

TM 10 for: Leveling gun
Zeroing M1A1
(TM 9-2350-215-10 for M60A1, TM 9-2350-257-10 for M60 Rise, and TM 9-2350-260-10 for M60)

TM 20-2 for: Removing and installing M13A1 elevation quadrant
Removing and installing M32 (or M35 gunner's periscope)
(TM 9-2350-215-20-2 for M60A1, TM 9-2350-257-20-2 for M60A1 Rise, and TM 9-2350-260-20-2 for M60)

TM 9-1240-258-34 for locating of rangefinder

EQUIPMENT CONDITION: Vehicle parked on level ground
Gun pointed level
Vehicle MASTER SWITCH off

4-5. BALLISTICS DRIVE INSTALLATION (CONT)

NOTE

When a step is to be done for only some of the ballistics drive models, the models will be shown, (M10, M10A1) means the step is only to be done for models M10 and M10A1. It is not easy to change ballistics drives between vehicles. If the ballistics drive being installed is not the same one removed from the vehicle, the locator pins may not line up with holes in the ballistics drive. You may have to drill new holes to put the locator pins in.

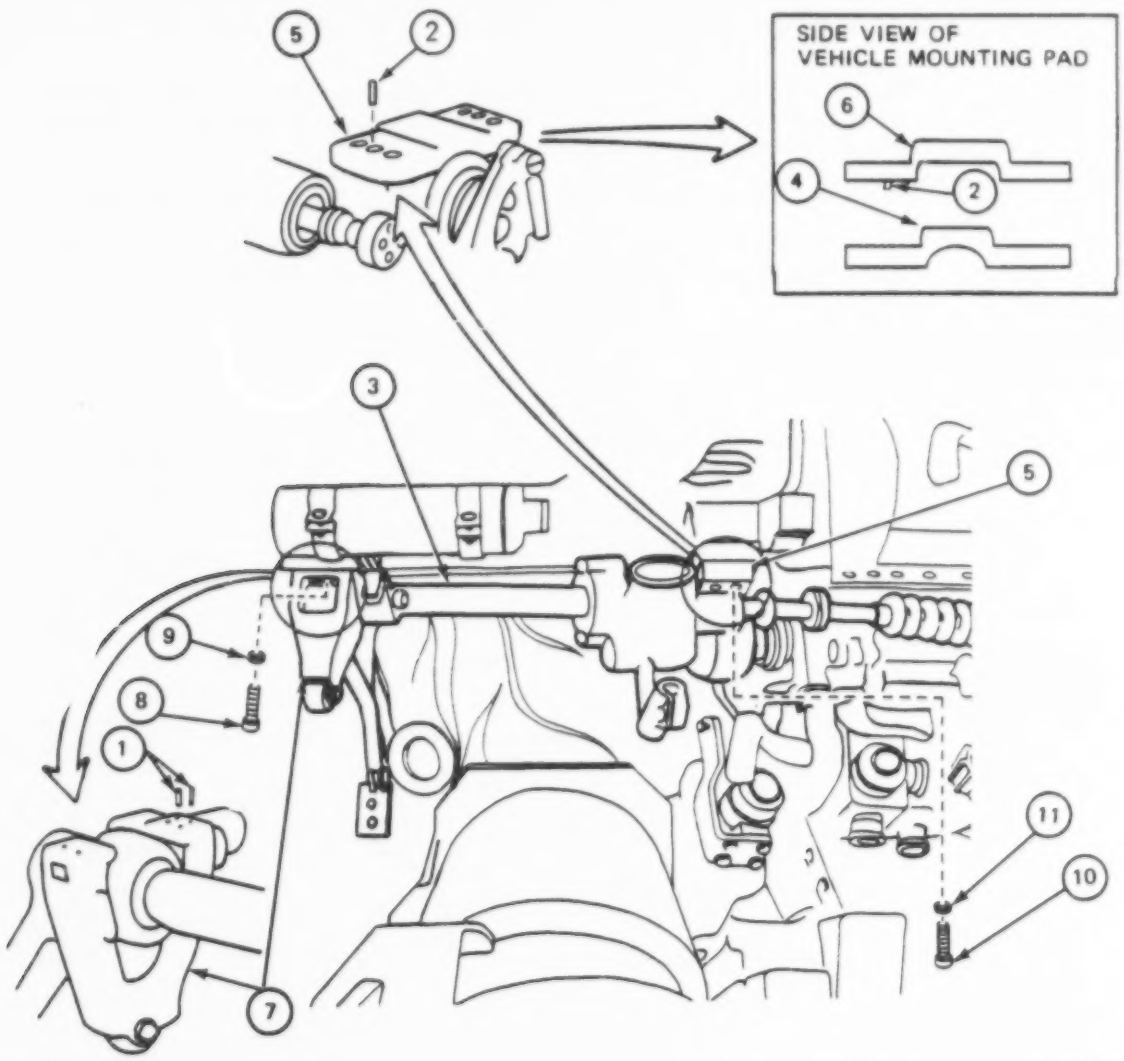
FRAME 1

Step	Procedure
1.	Look to see if left support locator pins (1) or right support locator pin (2) are damaged. If damaged, replace with good pin(s). If new ballistics drive is being installed, remove pin (2).
	WARNING CLEANING SOLVENTS CAN CAUSE FIRES Cleaning solvents and fumes from cleaning solvents can catch on fire. Keep it and all materials that can catch on fire away from flames. Use only in a room with a lot of fresh air.
2.	Using a cleaning rag and alcohol or solvent, clean all turret mounting pads and ballistics drive mounting surfaces (JPG).
3.	Repairman B outside the turret: carefully hand ballistics drive through loaders hatch to repairmen A and C inside vehicle.
	CAUTION Use care when installing left and right support assemblies. Slide assemblies straight up to keep from damaging locator pins (1 and 2), if installed.
4.	Repairmen A, B, and C: raise ballistics drive (3) to turret mounting pads. Make sure locating key (4) on right support assembly (5) is lined up with keyway (6) in turret mounting pad.
5.	Repairmen A and C: hold ballistics drive (3) in place.

TM 9-1220-220-34

4-5. BALLISTICS DRIVE INSTALLATION (CONT)

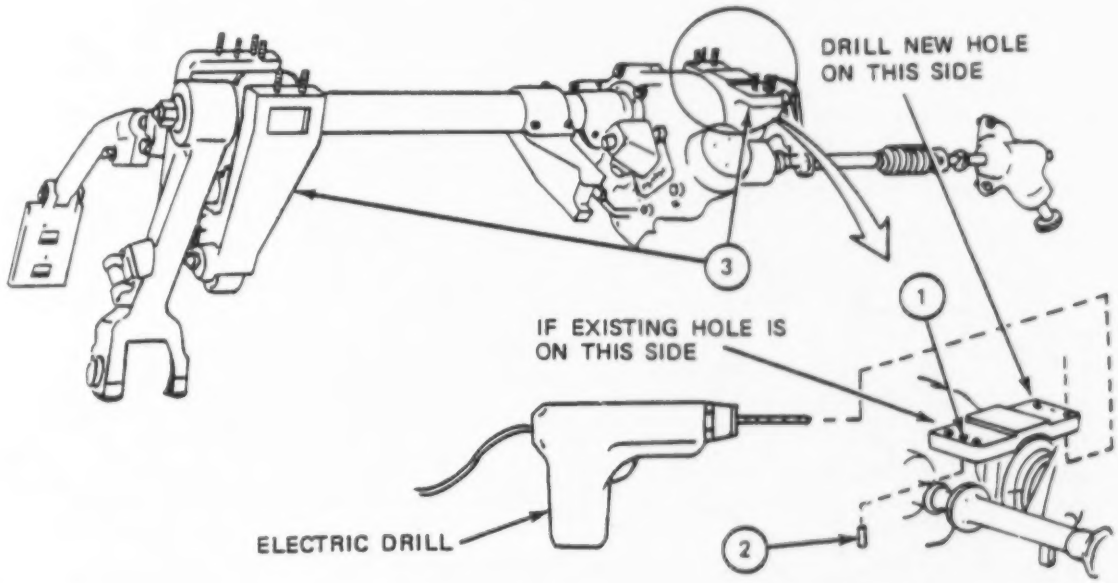
Step	Procedure
6.	Repairman B: using 5/16" hexagon stud socket, universal joint, 6" extension, and ratchet, install left support assembly (7) to turret mounting pad with four capscrews (8) and four lockwashers (9). Do not tighten screws.
7.	Repairman B: using 5/16" hexagon stud socket, universal joint, 6" extension, and ratchet, install right support assembly (5) to turret mounting pad with four capscrews (10) and four lockwashers (11). Do not tighten screws.
	GO TO FRAME 2



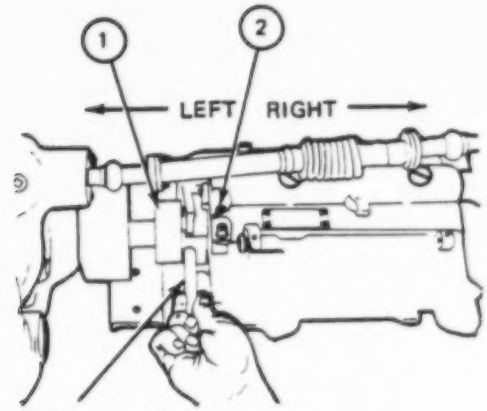
4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 2

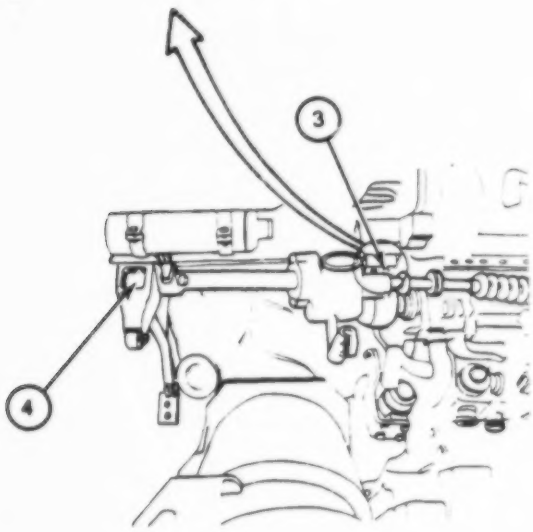
Step	Procedure
	NOTE Do steps 1 thru 4 only if locator pins were removed from new or different ballistics drive in frame 1. Go to frame 3 if pins were not removed.
1.	Look to see if right support locator pin hole (1) matches up with the pin hole in turret mounting pad. If holes do not match up, do steps 2 and 3. If holes do match up, go to step 4.
2.	If existing hole is in front of the support bracket, drill new hole in back. Using electric drill with 15/64" drill bit, drill one hole through right support bracket into turret mounting pad. Drill hole 1" deep (JPG).
3.	Using reamer, ream hole so that a 1/4" locator pin 1" long can be hammered in.
4.	Using hammer, drive one 1" long, 1/4" diameter locator pin (2) through right support assembly (3) into turret mounting pad. GO TO FRAME 3



4-5. BALLISTICS DRIVE INSTALLATION (CONT)



SPACER GAUGE TOOL

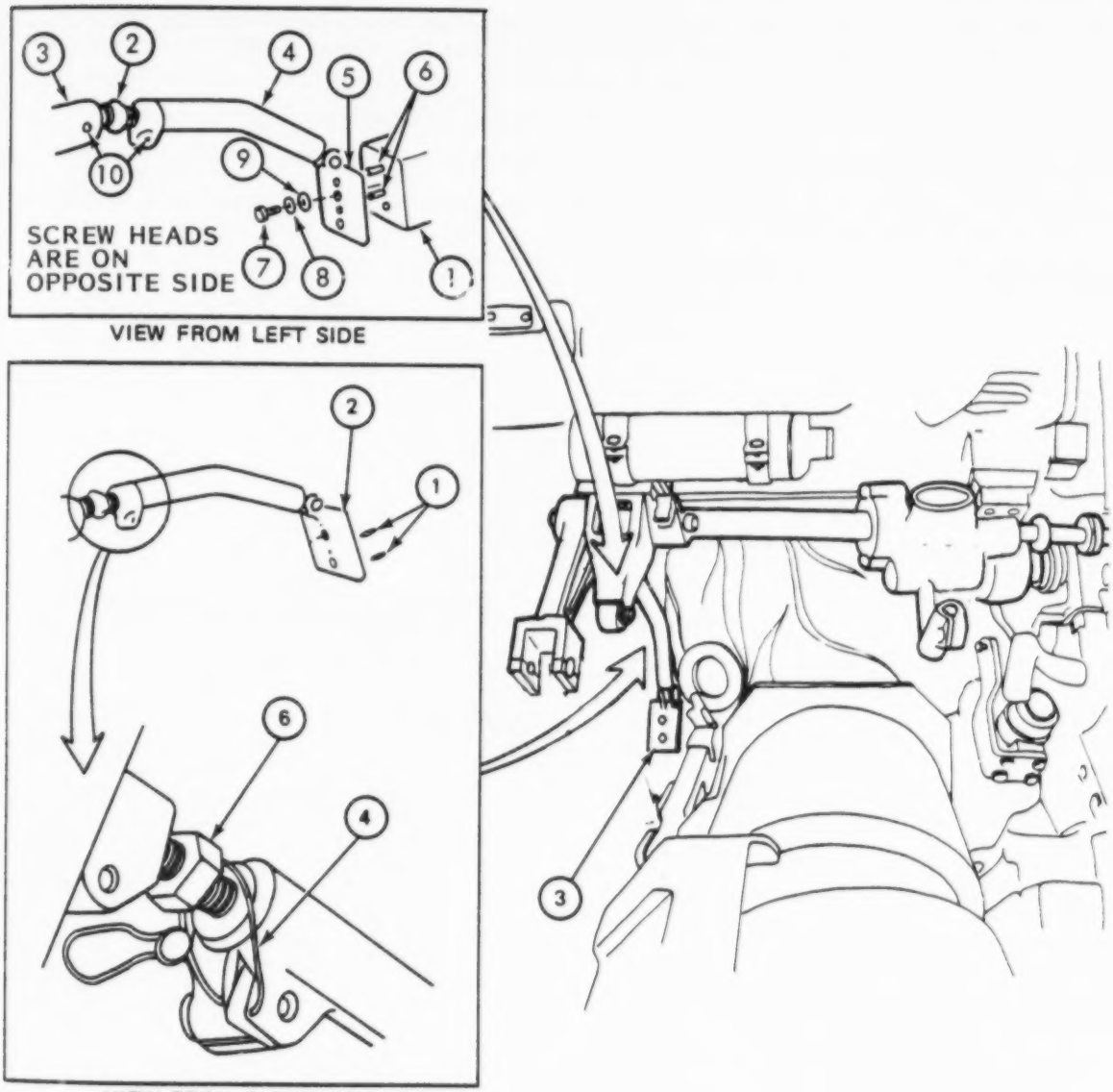


4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 3

Step	Procedure
1.	Using rag and alcohol, clean turret mounting pad (1) (JPG).
1A.	If not installed, install 2 no. 3 tapered pins 1-1/2"long through holes provided so that temperature conpensating rod may be properly adjusted. **CAUTION** Place gun tube at maximum elevation to prevent injury and to provide easier access to component.
2.	Repairman A, position adjuster (2) into support arm (3). Turn adjuster (2) by hand to mesh threads.
3.	Repairman A, using 1-1/16" wrench, screw adjuster (2) into support arm (3) and rod (4) until clearance is enough to mount bracket (5) onto turret mounting pad (1). Make sure pin holes in bracket (5) are lined up with pins (6).
4.	Repairman A, guide bracket (5) onto turret mounting pad pins (6) while repairman B turns adjuster (2) clockwise to lengthen rod (4).
5.	Repairman B, using 9/16" wrench, install two screws (7), two lockwashers (8), and two flat washers (9) into mounting bracket (5) and mounting pad (1).
6.	Repairman A, using 3/4" wrench, tighten two screws (10) to support arm (3) and rod (4). Install seal (11).
7.	Remove 2 No. 3 tapered pins 1-1/2" long from left support assembly inserted prior to installation. GO TO FRAME 5

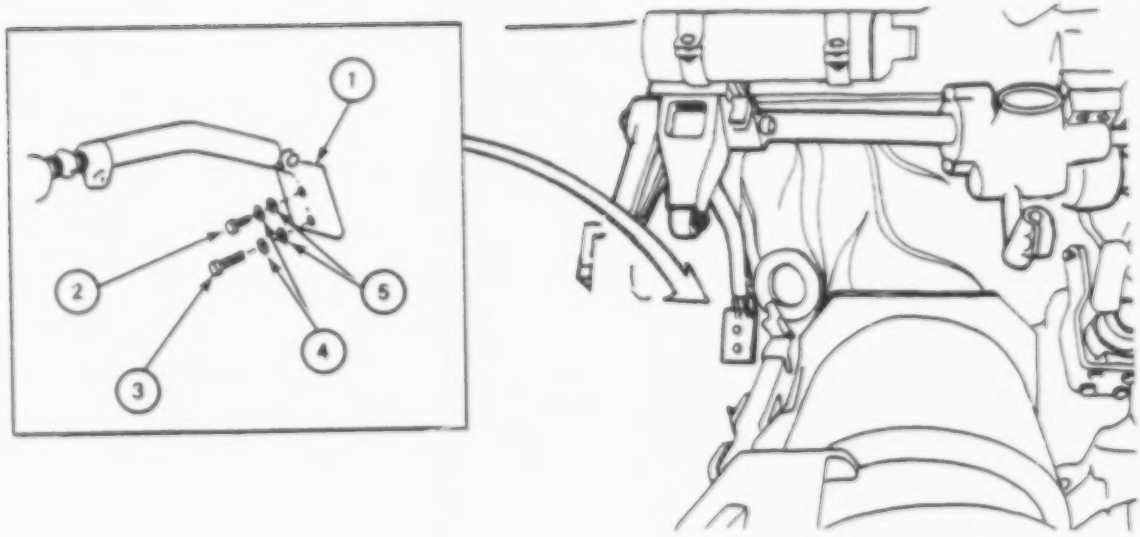
4-5. BALLISTICS DRIVE INSTALLATION (CONT)



4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 4

Step	Procedure
1.	Using 9/16" box end wrench, install temperature compensating rod bracket (1) to turret mounting pad on turret wall with two screws (2) and (3), two lockwashers (4), and two flat washers (5).
2.	Using torque wrench, tighten screw (2) to 5 foot-pounds (JPG).
3.	Using torque wrench, tighten screw (3) to 5 foot-pounds (JPG).
4.	Do steps 2 and 3 adding 5 foot-pounds per screw until torque on screws (2) and (3) is 21 to 24 foot-pounds (JPG).



4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 5

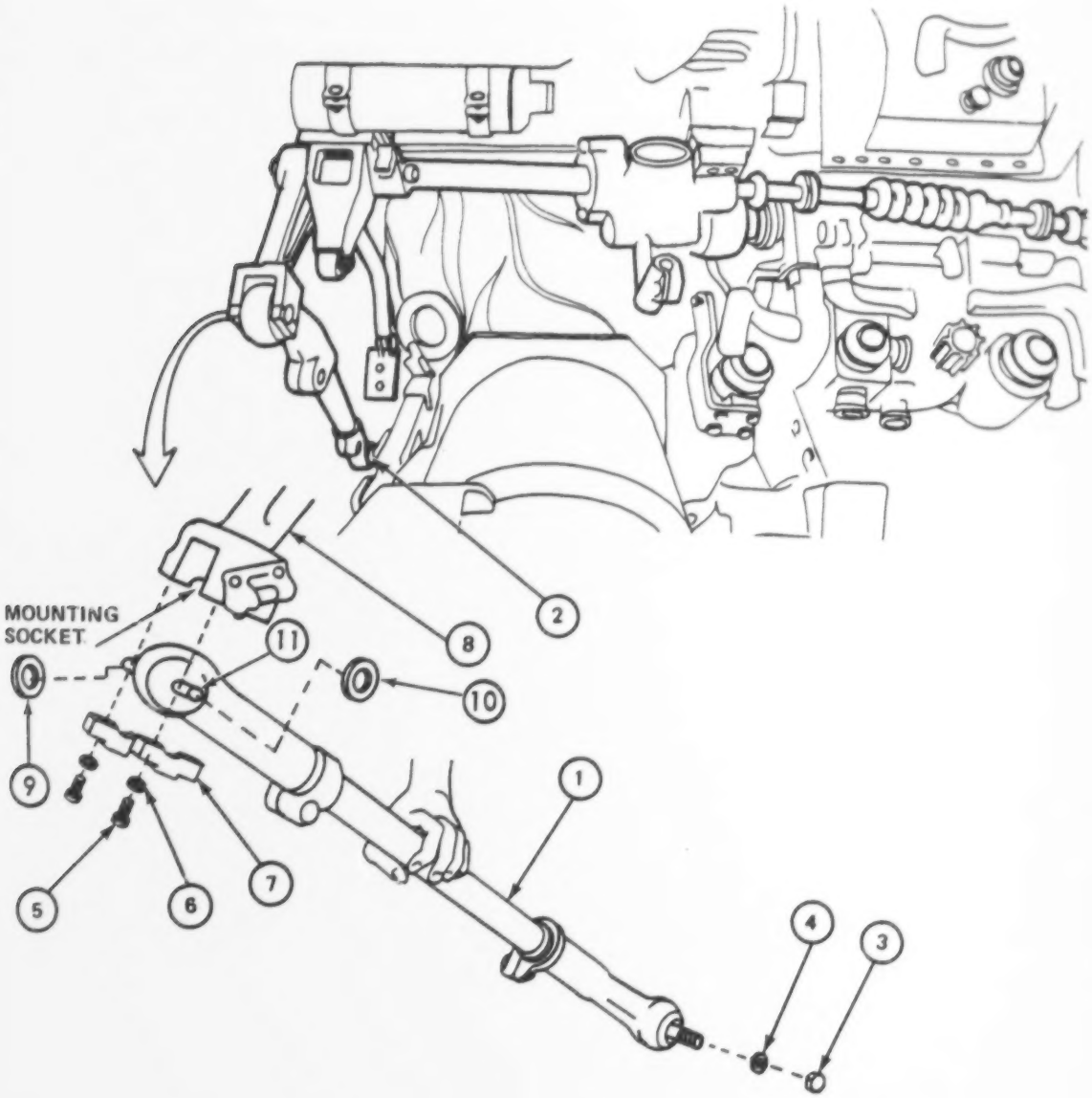
Step	Procedure
1.	Move ballistics drive left or right until there is a space of 0.719 to 0.718 inch measured with spacer gauge tool between coupling assembly (1) and periscope mount machined surface (2). (Gauge should be maintained in place until bolts mounting drive are torqued).
2.	Using torque wrench, tighten four capscrews (3) 5 foot-pounds per capscrew (JPG).
3.	Using torque wrench, tighten four capscrews (4) 5 foot-pounds per capscrew (JPG).
4.	Do steps 2 and 3 adding 5 foot-pounds per capscrew until torque on capscrew (3) and (4) is 30 to 33 foot-pounds (JPG).
5.	Using spacer gauge tool, recheck that space between coupling assembly (1) and periscope mount machined surface (2) is still 0.719 to 0.718 inch.
	GO TO FRAME 3

4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 6

Step	Procedure
1.	Level the gun to within plus or minus 1.5 mils with the gunner's quadrant (TM 9-2350-215-10).
2.	Using 5/16" box end wrench, install trunnion link (1) to gun trunnion arm (2) on turret wall with nut (3) and washer (4).
3.	Using 1/2" box end wrench, remove four screws (5) and four lockwashers (6) holding two caps (7) to left support assembly (8).
4.	Place spacers (9 and 10) on spindle (11).
5.	Insert spindle (11) in left support assembly (8).
6.	Repairman A: hold trunnion link (1) in place against mounting socket in left support assembly (8).
7.	Repairman B: using 1/2" box end wrench, install four screws (5) and four lockwashers (6) to hold caps (7) to left support assembly (8). GO TO FRAME 7

4-5. BALLISTICS DRIVE INSTALLATION (CONT)

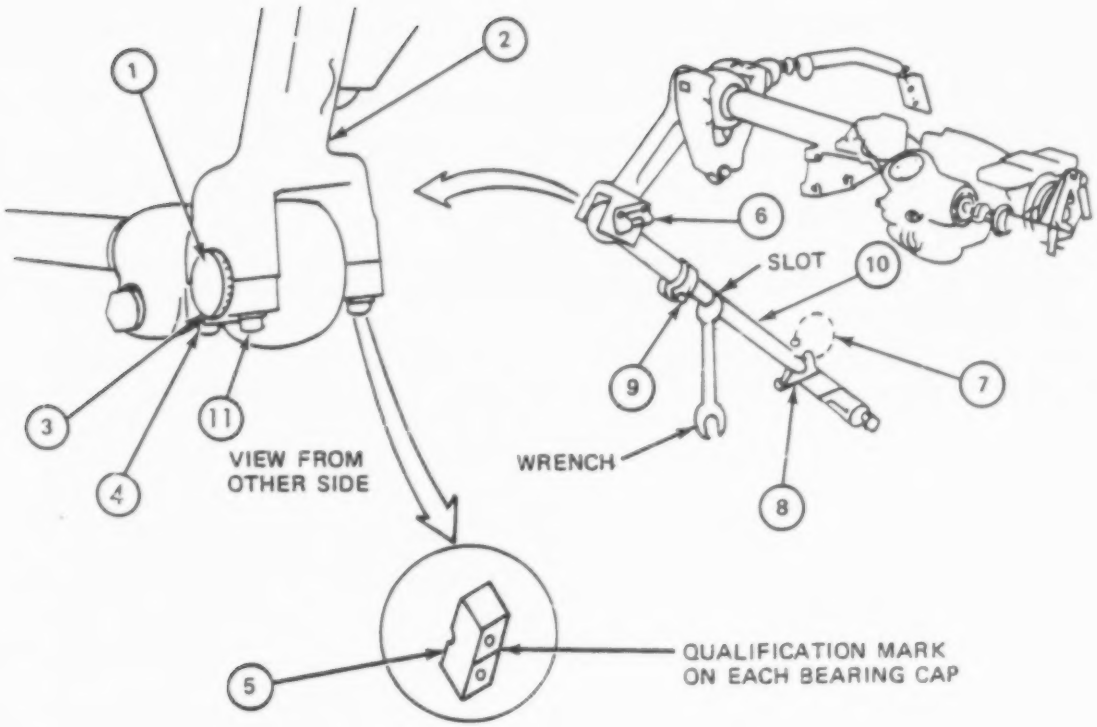


4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 7

Step	Procedure
1.	Turn index (1) on trunnion link (2) until "0" mark (3) is lined up with qualifying mark (4) on bearing cap (5), tighten four screws (11).
2.	Look and see if fire control (6) bubble is centered. If not centered, go to step 3. If centered, go to frame 8.
3.	Using wire cutters, cut lockwire (7).
4.	Using 15/16" open end wrench, loosen two screws (8) and (9).
5.	Using 1 1/4" open end wrench, turn adjuster arm (10) until fire control level (6) bubble is centered.
6.	Using 15/16 open end wrench, tighten two screws (8) and (9).
7.	Using lockwire tool, install new lockwire (7) (JPG).
	GO TO FRAME 8

4-5. BALLISTICS DRIVE INSTALLATION (CONT)

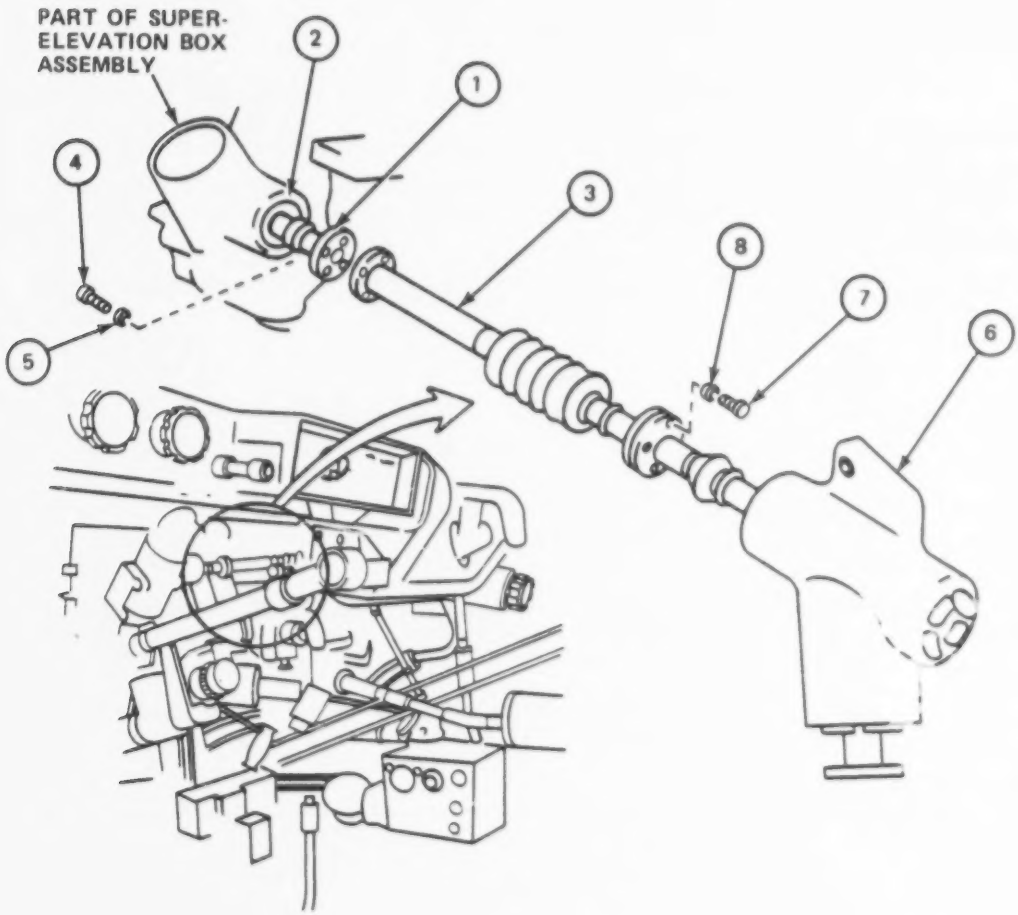


4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 8

Step	Procedure
	NOTE Do steps 1,2, and 3 for M10A3 only.
1.	Turn the superelevation box output shaft (1) fully clockwise, then, turn counterclockwise to the number of turns marked on qualification plate (2).
2.	Aline mark on output shaft (1) with index mark on qualification plate (2).
3.	Set electronic computer to ""zero" elevation.
4.	Using 3/16" flat tip screwdriver, install shaft (3) on superelevation box output shaft (1) with four screws (4) and four lockwashers (5).
5.	Using 3/16" flat tip screwdriver, install shaft (3) on junction box assembly (6) (install shaft (3) on inner drive shaft of electronic computer for M10A3) with four screws (7) and four lockwashers (8). GO TO FRAME 9

4-5. BALLISTICS DRIVE INSTALLATION (CONT)

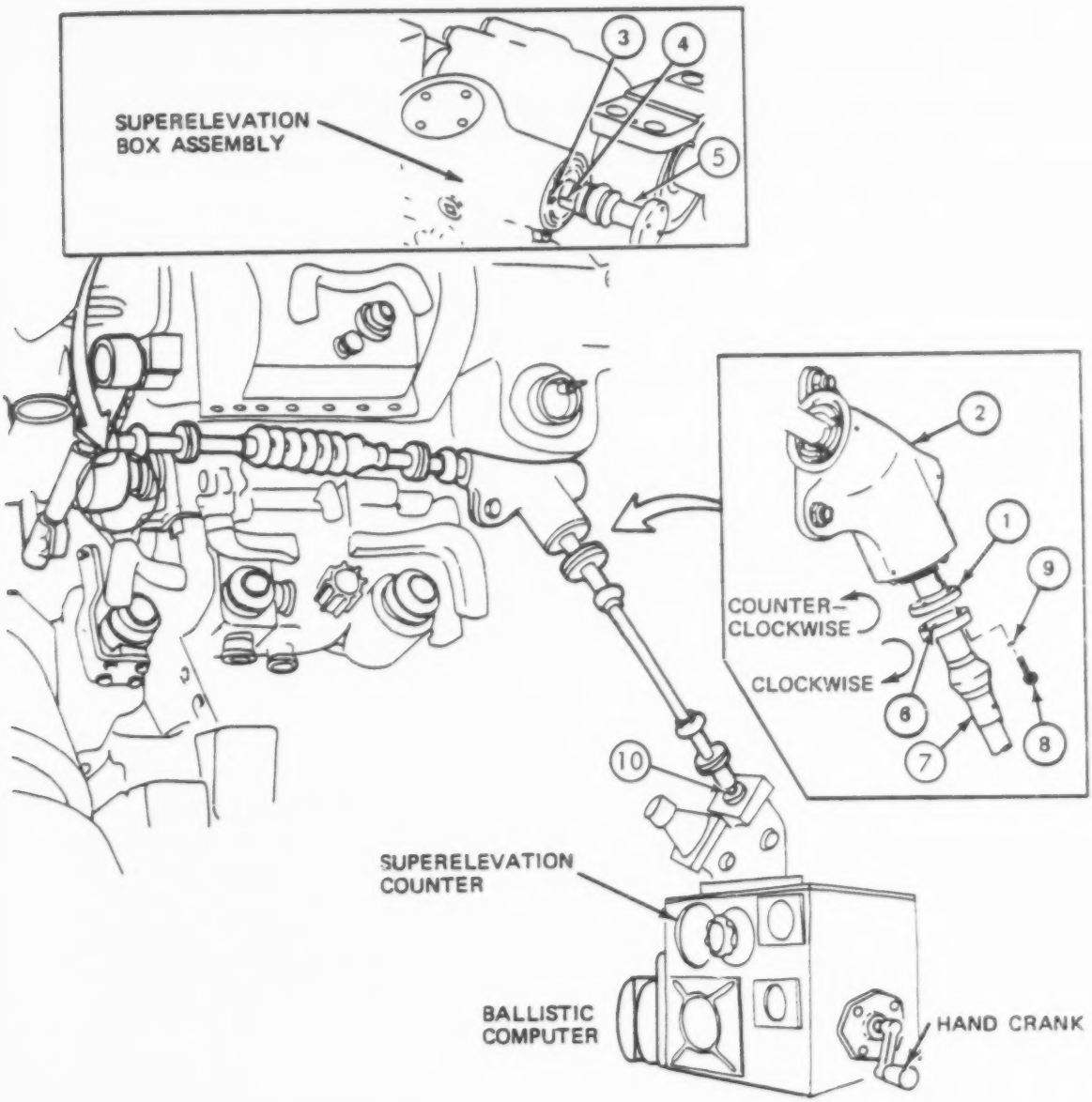


4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 9

Step	Procedure
	NOTE If installing M10A3 go to frame 10.
1.	Turn the input shaft (1) on junction box assembly (2) to the right until it stops.
2.	Turn input shaft (1) to the left for the number of turns stamped on the qualification plate (3). The mark (4) on the input shaft (5) should line up with the index mark on the qualification plate (3).
3.	Push in on hand crank of ballistic computer and crank until the superelevation counter reads zero (TM 10).
	NOTE If holes, in superelevation drive shaft (7) do not line up with holes in junction box assembly input shaft (1) do not move the line up between the input shaft and the mark on the qualification plate, do step 4. If holes are lined up, go to step 5.
4.	Slide superelevation drive shaft (6) off ballistic computer output shaft (10). Install with four holes on superelevation drive shaft (7) lined up with four holes on junction box assembly input shaft (1).
5.	Using 3/16" flat tip screwdriver. Install superelevation drive shaft (7) to input shaft (1) with four screws (8) and four lockwashers (9). GO TO FRAME 10

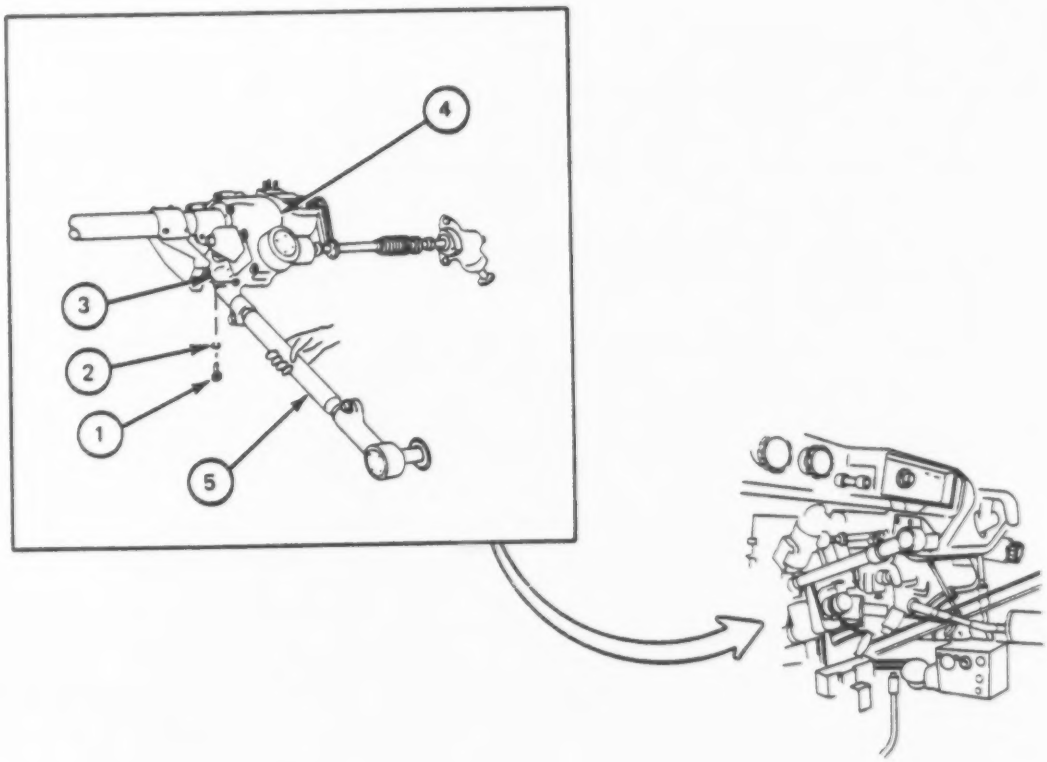
4-5. BALLISTICS DRIVE INSTALLATION (CONT)



4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 10

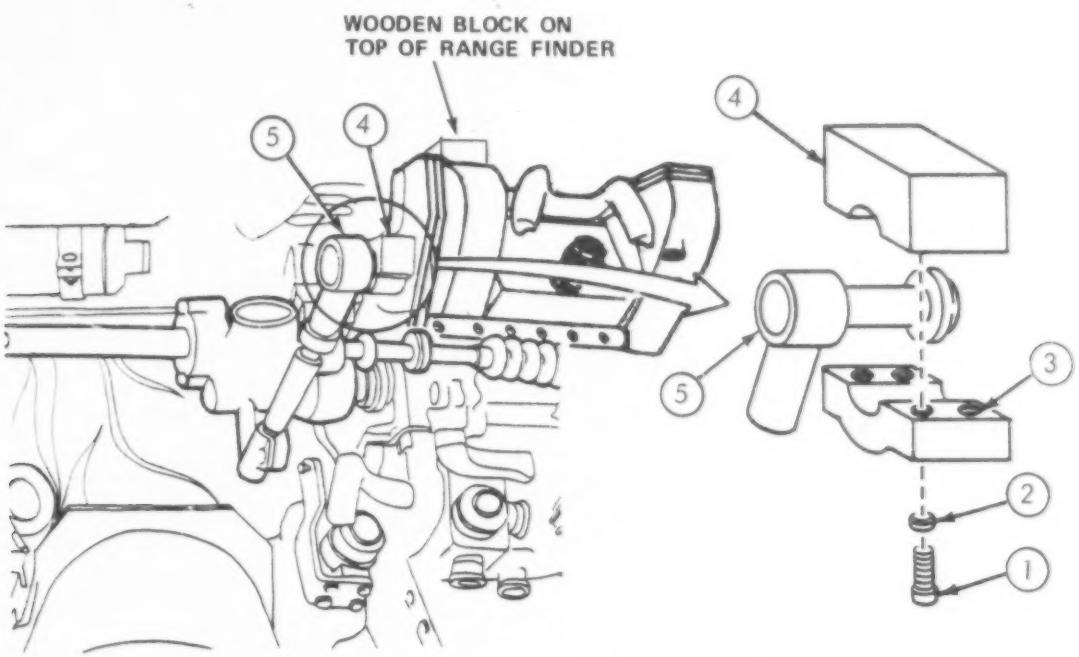
Step	Procedure
1.	Using 1/2" box end wrench, remove four screws (1) and four lockwashers (2) holding cap (3) to superelevation box (4).
2.	Repairman A: hold rangefinder link connector assembly (5). Repairman B: using 1/2" box end wrench, install link connector assembly (5) to superelevation box (4) with cap (3), four screws (1), and four lockwashers (2). GO TO FRAME 11



4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 11

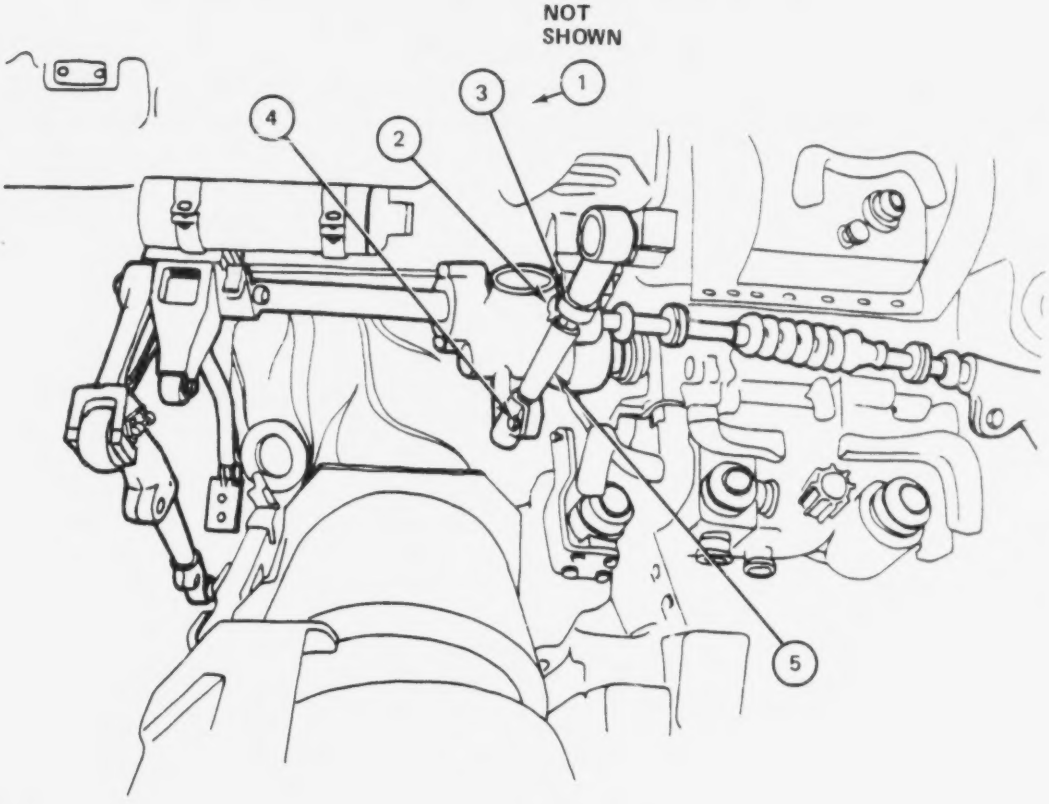
Step	Procedure
1.	Using 1/2" box end wrench, remove four screws (1) and four lockwashers (2) holding cap (3) to range finder (4).
2.	Using 1/2" box end wrench, hold link connector assembly (5) in socket (4) and install lockwashers (2), screws (1) and caps (3) to rangefinder (4).
3.	Remove wooden block. GO TO FRAME 12



4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 12

Step	Procedure
1.	Look to see if rangefinder level vial bubble (1) is centered (TM 9-1240-240-34). If bubble is centerd, go to frame 13. If bubble is not centered, go to step 2.
2.	Using wire cutters, cut lockwire (2).
3.	Using 3/4" open end wrench, loosen two screws (3) and (4).
4.	Turn link connector tube (5) until rangefinder level vial bubble (1) is centered.
5.	Using 3/4" open end wrench, tighten two screws (3) and (4).
6.	Using lockwire tool, install new lockwire (2) (JPG).
	GO TO FRAME 13



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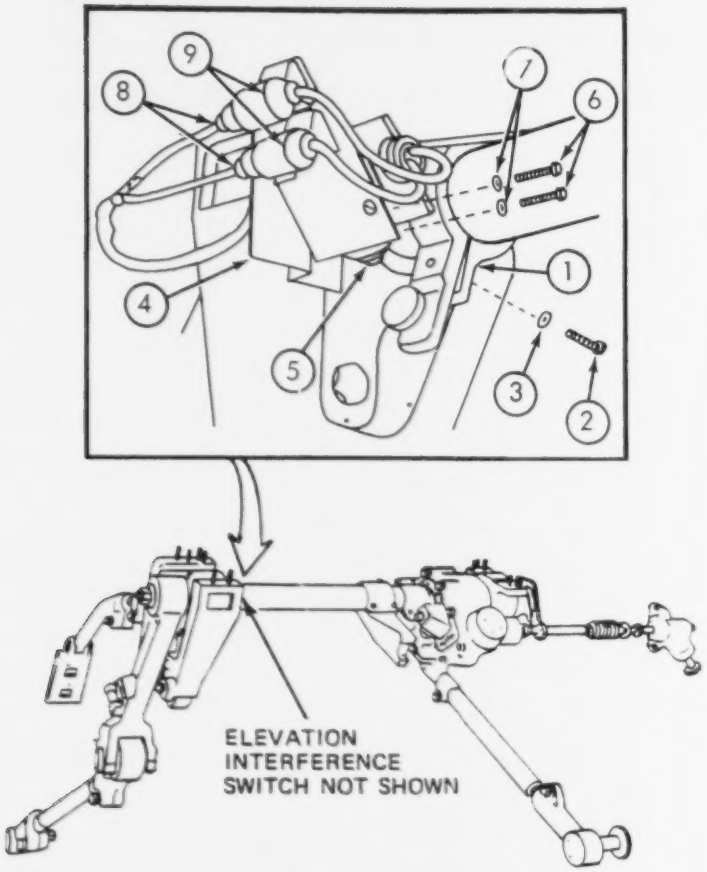
4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 13

Step	Procedure
1.	Using 7/16" wrench, install clamp assembly (1) (limit stop attached), using one screw (2) and one lockwasher (3).
2.	Using screwdriver, install bracket (4), switch (5) (attached) using two screws (6) and two lockwashers (7).
3.	Connect electrical plugs (8) to electrical connectors (9).
	NOTE FOLLOW-ON MAINTENANCE Install M13A1 elevation quadrant (TM 20-2). Install M32 (or M35) gunner's periscope (TM 20-2). Do performance test (Vol I, para 2-2).
	END OF TASK

4-5. BALLISTICS DRIVE INSTALLATION (CONT)



Section 3. TEMPERATURE COMPENSATING ROD

4-6. TEMPERATURE COMPENSATING ROD MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	4-7
Installation	4-8

4-7. TEMPERATURE COMPENSATING ROD REMOVAL

TOOLS: 3/4" box end wrench
6" slip joint pliers

PERSONNEL: One

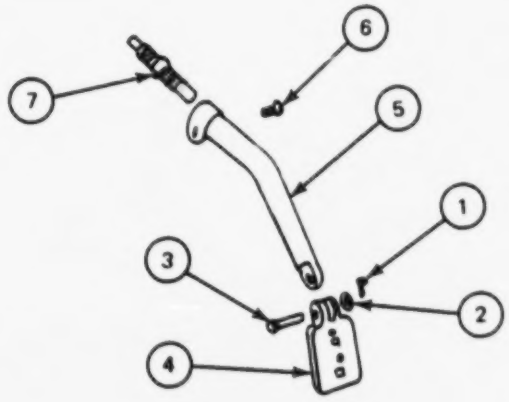
REFERENCES: JPG-41C for removing cotter pins

EQUIPMENT CONDITION: Temperature compensating rod and related parts on work bench

PRELIMINARY PROCEDURE: Remove temperature compensating rod and related parts (para 4-4, frame 7)

FRAME 1

Step	Procedure
1.	Using slip joint pliers, remove cotter pin (1) and washer (2) from pin (3) (JPG).
2.	Slide pin (3) out of bracket (4). Remove bracket (4) from rod (5).
3.	Using box end wrench, loosen capscrew (6).
	NOTE Count and record number of turns while removing adjuster (7).
4.	Holding rod (5), unscrew adjuster (7) clockwise (left-hand thread).
	END OF TASK



4-8. TEMPERATURE COMPENSATING ROD INSTALLATION

TOOLS: 3/4" box end wrench
6" slip joint pliers

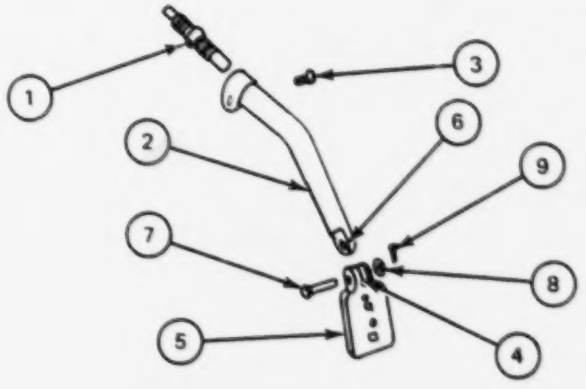
PERSONNEL: One

REFERENCES: JPG 41C for installing cotter pins

EQUIPMENT CONDITION: Temperature compensating rod and related parts on work bench

FRAME 1

Step	Procedure
1.	Screw adjuster (1) on rod (2) counterclockwise (left-hand thread) the number of turns recorded during removal procedure.
2.	Using wrench, tighten capscrew (3).
3.	Place two lugs (4) of bracket (5) over the lug (6) of the rod (2) with machined surface as shown. Slide pin (7) through lugs (4 and 6).
4.	Place washer (8) on pin (7). Install cotter pin (9) (JPG).
	NOTE FOLLOW-ON MAINTENANCE Install temperature compensating rod and related parts (para 4-5, frame 4). Do performance test (Vol I, para 2-2).
	END OF TASK



Section 4. TRUNNION LINK

4-9. TRUNNION LINK MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	Para 4-4, frame 6
Disassembly	4-10
Assembly	4-11
Installation	Para 4-5, frame 6

4-10. TRUNNION LINK DISASSEMBLY

TOOLS: 7/8" and 15/16" box end wrenches

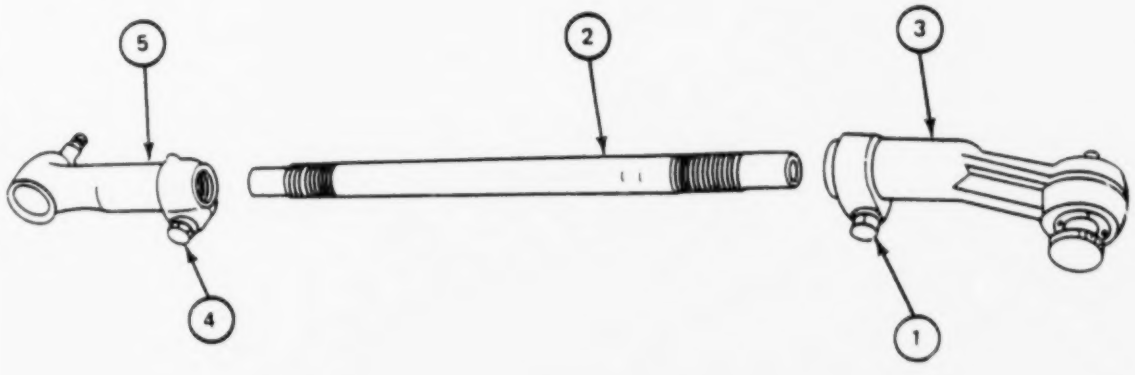
PERSONNEL: One

EQUIPMENT CONDITION: Trunnion link on work bench

PERLIMINARY PROCEDURE: Remove trunnion link (para 4-4, frame 6)

FRAME 1

Step	Procedure
	NOTE Count and record number of turns in steps 2 and 4.
1.	Using 5/16" box end wrench, loosen capscrew (1).
2.	Holding tube (2), unscrew connector assembly (3).
3.	Using 7/8" box end wrench, loosen capscrew (4).
4.	Holding tube (2), unscrew connector assembly (5) clockwise (left-hand thread).
	END OF TASK



4-11 TRUNNION LINK ASSEMBLY

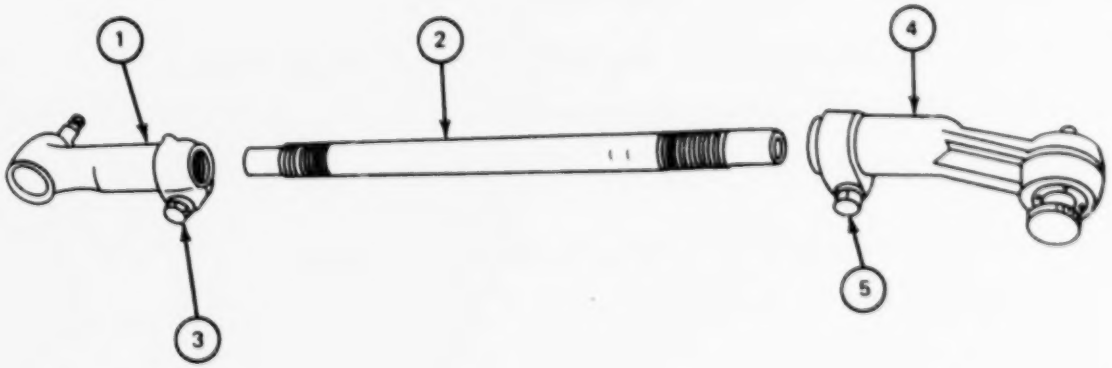
TOOLS: 7/8" and 15/16" box end wrenches

PERSONNEL: One

EQUIPMENT CONDITION: Trunnion link on work bench

FRAME 1

Step	Procedure
1.	Screw connector assembly (1) on tube (2) counterclockwise (left-hand thread) the number of turns recorded during removal procedure.
2.	Using 7/8" box end wrench, tighten capscrew (3).
3.	Screw connector assembly (4) on tube (2) the number of turns recorded during removal procedure.
4.	Using 15/16" box end wrench, tighten capscrew (5).
	NOTE FOLLOW-ON MAINTENANCE Install trunnion link (para 4-5, frame 6). Do performance test (Vol I, para 2-2).
	END OF TASK



Section 5. DRIVE CONNECTOR

4-12. DRIVE CONNECTOR MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	Para 4-10, frame 1
Disassembly	4-13
Assembly	4-14
Installation	Para 4-11, frame 1

4-13. DRIVE CONNECTOR DISASSEMBLY

TOOLS: .050 allen wrench
2 3/16 pin spanner wrench

PERSONNEL: One

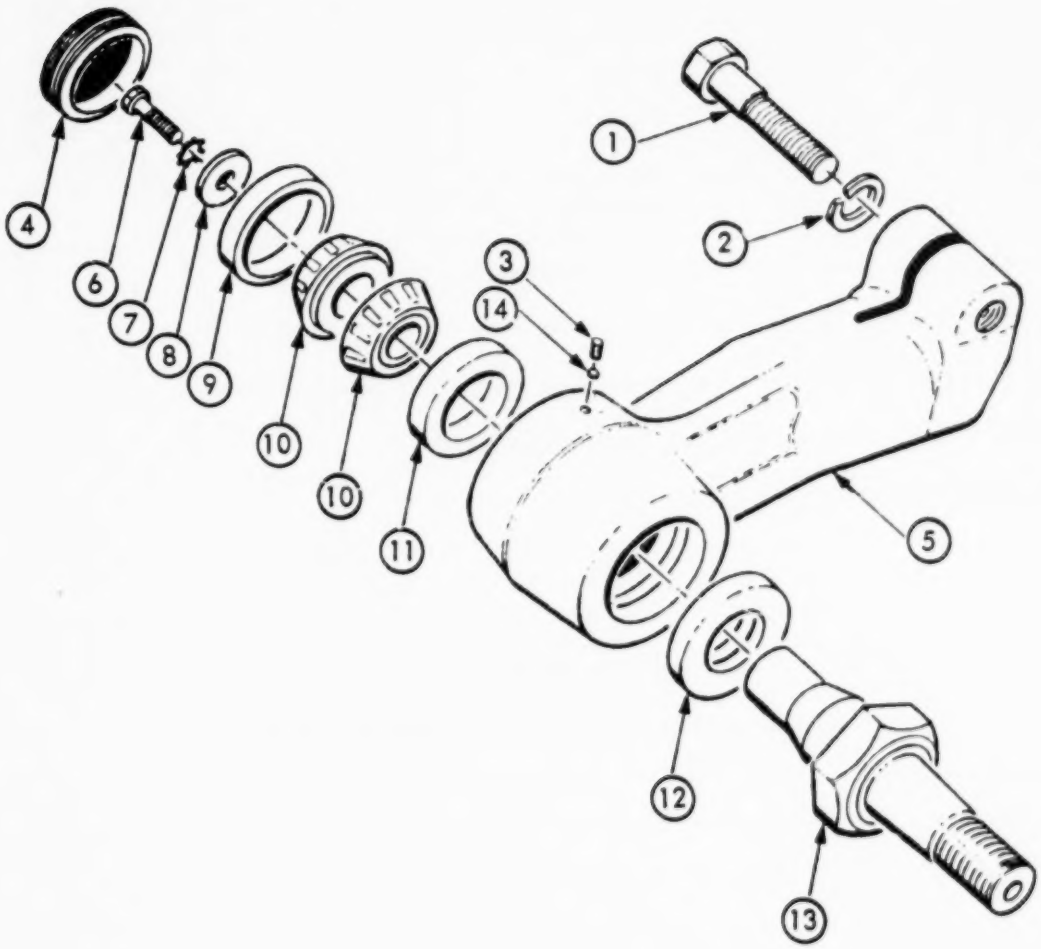
EQUIPMENT CONDITION: Drive connector on work bench

PRELIMINARY PROCEDURE: Remove drive connector (para 4-10, frame 1)

FRAME 1

Step	Procedure
1.	Unscrew cap screw (1) and remove cap screw (1) and lockwasher (2).
2.	Loosen two setscrews (3) using .050 allen wrench.
3.	Remove pillow block cap (4) from connector (5), using 2 3/16 pin spanner wrench.
4.	Remove cap screw (6), lockwasher (7) and flatwasher (8).
5.	Carefully press out seal (9), bearings (10), seals (11 and 12), and stud (13). Discard seals if damaged.
6.	Remove disks (14) by tightening setscrews (3), using .050 allen wrench.
7.	Discard disks (14) and remove setscrews (3).
	END OF TASK

4-13. DRIVE CONNECTOR DISASSEMBLY (CONT)



4-14. DRIVE CONNECTOR ASSEMBLY

TOOLS: .050 allen wrench
2 3/16 pin spanner wrench

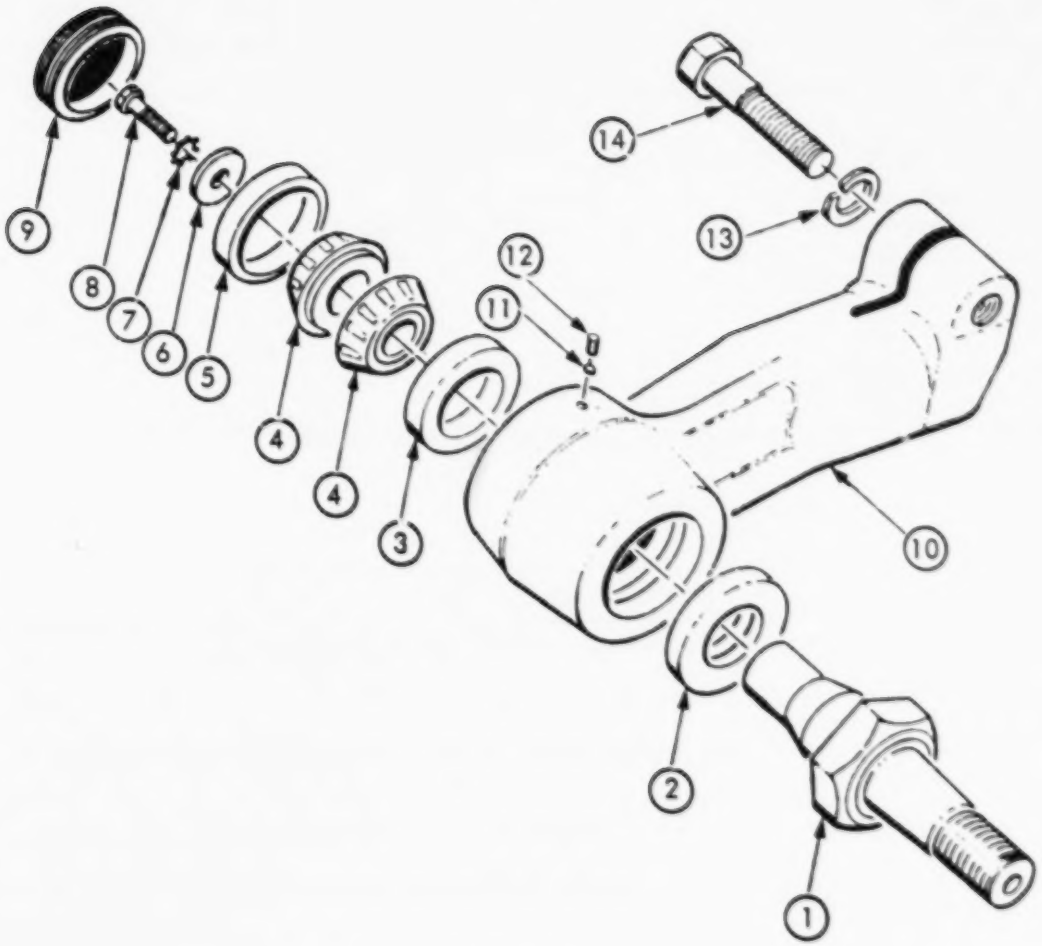
PERSONNEL: One

EQUIPMENT CONDITION: Drive connector on work bench

FRAME 1

Step	Procedure
1	Carefully install stud (1), seals (2 and 3), bearings (4), and seal (5).
2.	Install flat washer (6), lockwasher (7), and cap screw (8).
3.	Install pillow block cap (9) on connector (10), using 2 3/16 pin spanner wrench.
4.	Install disks (11) and setscrews (12), using .050 allen wrench.
5.	Install lockwasher (13) and cap screw (14).
	FOLLOW-ON MAINTENANCE Install assembled drive connector assembly (para 4-11).
	END OF TASK

4-14. DRIVE CONNECTOR ASSEMBLY (CONT)



Section 6. LINK CONNECTOR

4-15. LINK CONNECTOR MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	Para 4-10, frame 1
Disassembly	4-16
Assembly	4-17
Installation	Para 4-11, frame 1

4-16. LINK CONNECTOR DISASSEMBLY

TOOLS: .050 allen wrench
.078 allen wrench
2 3/16 pin spanner wrench

PERSONNEL: One

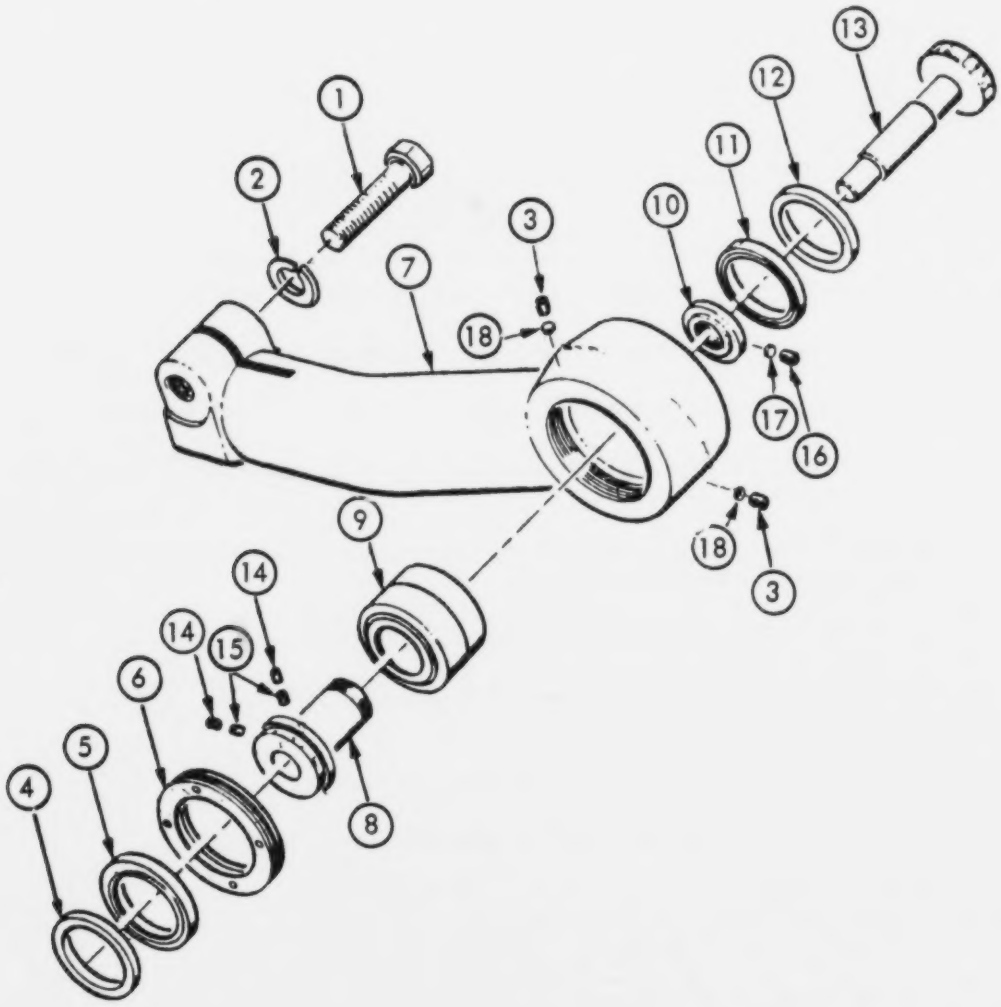
EQUIPMENT CONDITION: Link connector on work bench

PRELIMINARY PROCEDURE: Remove link connector (para 4-10, frame 1)

FRAME 1

Step	Procedure
1.	Unscrew cap screw (1) and remove cap screw (1) and lockwasher (2).
2.	Loosen two setscrews (3), using .050 allen wrench.
3.	Remove flat washer (4), seal (5), and retainer (6) from connector (7) using 2 3/16 pin spanner wrench.
4.	Press seal (5) and washer (4) out of retainer (6). Discard seal and washer if damaged.
5.	Carefully press out sleeve (8), bearing (9), retainer (10), seal (11), flat washer (12) and spindle (13).
6.	Tighten setscrews (14) to remove disks (15), using .078 allen wrench. Discard disks (15) and remove setscrews (14).
7.	Tighten setscrews (16) to remove disks (17) using .078 allen wrench. Discard disks (17) and remove setscrews (16).
8.	Tighten setscrews (3) to remove disks (18), using .050 allen wrench. Discard disks (18) and remove setscrews (3).
	END OF TASK

4-16. LINK CONNECTOR DISASSEMBLY (CONT)



4-17. LINK CONNECTOR ASSEMBLY

TOOLS: .050 allen wrench
.078 allen wrench
2 3/16 pin spanner wrench

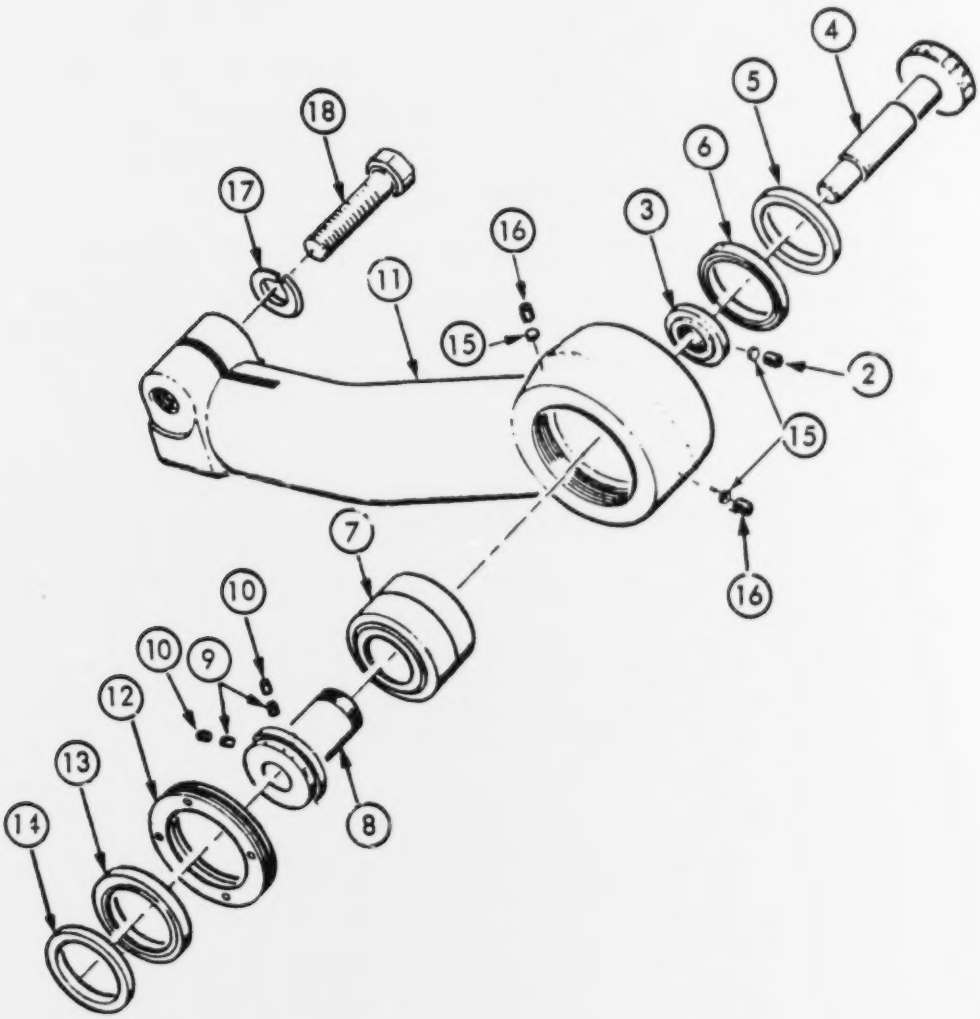
PERSONNEL: One

EQUIPMENT CONDITION: Link connector on work bench

FRAME 1

Step	Procedure
1.	Install disks (1) and setscrews (2) in retainer (3), using .078 allen wrench.
2.	Assemble spindle (4), flat washer (5), seal (6), retainer (3), bearing (7), and sleeve (8).
3.	Install disks (9) and setscrews (10) on sleeve (8), using .078 allen wrench.
4.	Install spindle (4), flat washer (5), seal (6), retainer (3), bearing (7) and sleeve (8) in connector (11).
5.	Install retainer (12), seal (13) and flat washer (14) on connector (11). Tighten retainer (12) using 2 3/16 pin spanner wrench.
6.	Install new disks (15) and setscrews (16) using .050 allen wrench.
7.	Install lockwasher (17) and cap screw (18) on connector (11).
	FOLLOW-ON MAINTENANCE Install assembled link connector assembly (para 4-11). END OF TASK

4-17. LINK CONNECTOR ASSEMBLY (CONT)



Section 7. FIRE CONTROL LEVEL

4-18. FIRE CONTROL LEVEL MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Disassembly	4-19
Assembly	4-20

4-19. FIRE CONTROL LEVEL DISASSEMBLY

TOOLS: 0.055 to 0.060 adjustable face spanner wrench
4 oz ball peen hammer
1/16" drive pin punch
Machnist's scriber
0.055 jeweler's screwdriver
1/4" flat tip screwdriver

PERSONNEL: One

EQUIPMENT CONDITION: Ballistic drive mounted in tank

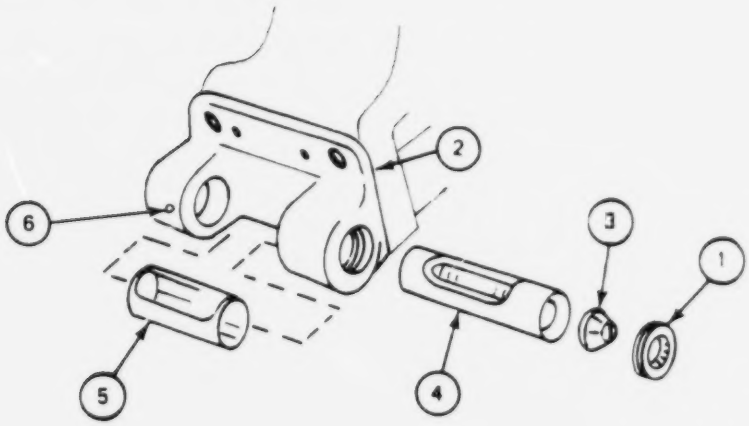
NOTE

Once the ballistic drive is removed from the vehicle, DS/GS does not have the tools to accurately set the fire control level for repair. If the fire control level needs repair, repair before removing ballistic drive from vehicle.

4-19. FIRE CONTROL LEVEL DISASSEMBLY

FRAME 1

Step	Procedure
1.	Using spanner wrench, remove threaded ring (1) from housing (2).
2.	Remove eccentric (3) from end of housing (2).
3.	Slide level (4) through cover (5) and housing (2).
4.	Remove cover (5) from housing (2).
	NOTE Do step 5 only if pin (6) is damaged.
5.	Using hammer and punch, drive pin (6) from housing (2).
	END OF TASK



4-20. FIRE CONTROL LEVEL ASSEMBLY

TOOLS: 0.055 to 0.060 adjustable face spanner wrench
4 oz. ball peen hammer
1/16" drive pin punch
0.055 jeweler's screwdriver
1/4" flat tip screwdriver

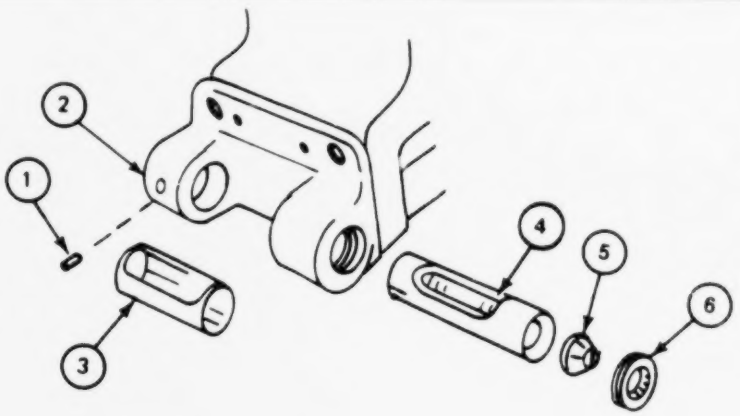
PERSONNEL: One

REFERENCES: TM 9-2350-232-10 for: Using M1A1 gunner's quadrant
Elevating and depressing gun

EQUIPMENT CONDITION: Ballistic drive mounted in tank

FRAME 1

Step	Procedure
	NOTE Do step 1 only if pin (1) was removed.
1.	Using hammer and punch, install pin (1) in housing (2).
2.	Position cover (3) on housing (2) and hold in place while installing level (4).
3.	Place eccentric (5) into threaded ring (6).
4.	Using spanner wrench, install threaded ring (6) with eccentric (5). Do not tighten.
	GO TO FRAME 2

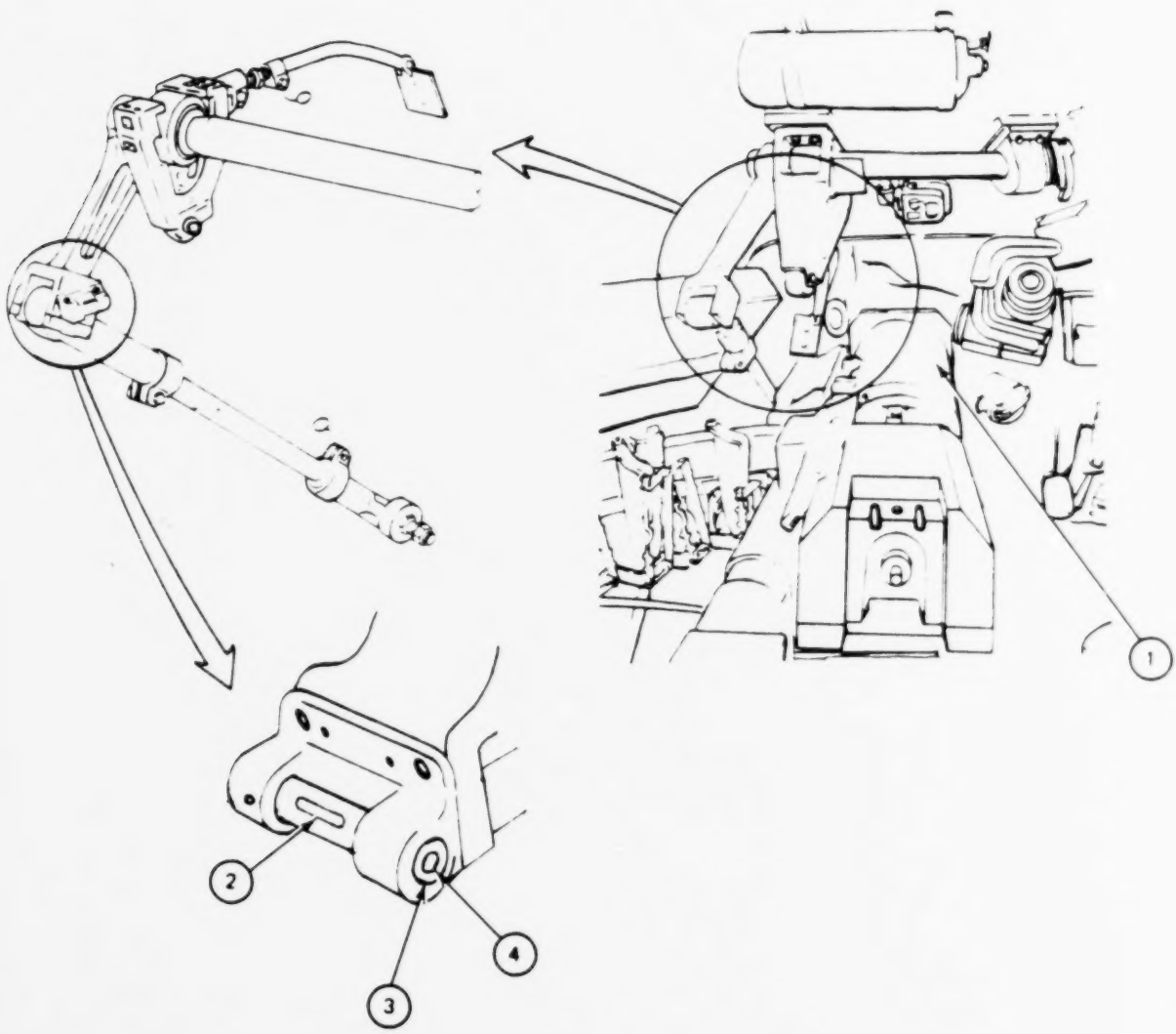


4-20. FIRE CONTROL LEVEL ASSEMBLY (CONT)

FRAME 2

Step	Procedure
1.	Place gunner's quadrant on gun tube (1) leveling pads (TM 10).
2.	Elevate or depress gun until level bubble in gunner's quadrant is centered (TM 9-2350-232-10).
3.	Check ballistics drive bubble (2) is centered.
	NOTE If bubble is centered, go to step 4; if not continue with step 2.
4.	Using spanner wrench, loosen ring (3) slightly.
5.	Using 3/16" screwdriver, turn eccentric (4) left or right until level bubble (2) is centered.
	NOTE Eccentric (3) may have to be held in position with 3/16" screwdriver, to prevent it from turning when doing next step.
6.	Using spanner wrench, tighten ring (3).
7.	Check level bubble (2) remains centered. If not repeat steps 2 through 5.
8.	Remove gunner's quadrant.
	NOTE FOLLOW-ON MAINTENANCE Do performance test (Vol I, Chap 2).
	END OF TASK

4-20. FIRE CONTROL LEVEL ASSEMBLY (CONT)



Section 8. LIGHT ASSEMBLY

4-21. LIGHT ASSEMBLY MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	4-22
Disassembly	4-23
Assembly	4-24
Installation	4-25

4-22. LIGHT ASSEMBLY REMOVAL

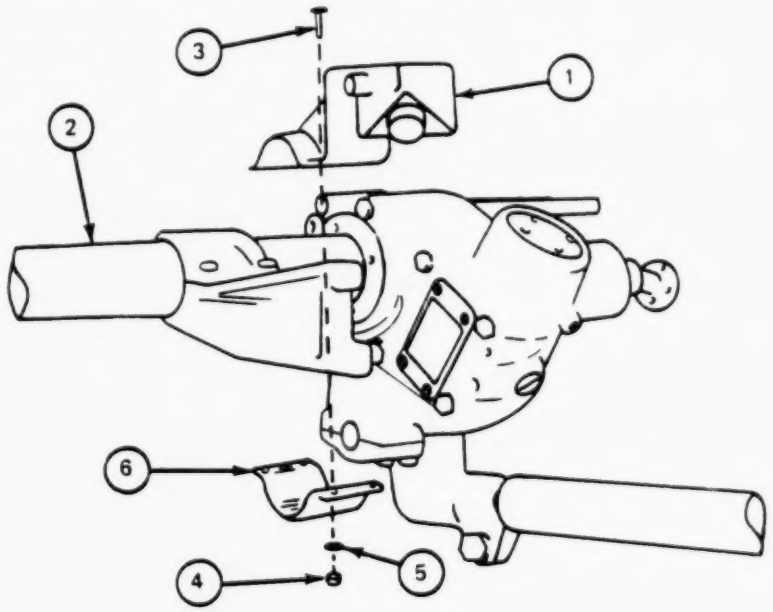
APPLICABLE CONFIGURATIONS: M10, M10A1, and M10A6

TOOLS: 7/16" box end wrench
7/16" open end wrench
Scriber

PERSONNEL: One

FRAME 1

Step	Procedure
1.	Using scriber, record the position of the light assembly (1) on the cross shaft (2).
2.	Hold four cap screws (3) with 7/16" open end wrench, using 7/16" box end wrench, remove four nuts (4), four lockwashers (5), and four cap screws (3) from light assembly (1).
3.	Remove clamp (6) from cross shaft (2).
4.	Remove light assembly (1) from cross shaft (2).
	END OF TASK



4-23. LIGHT ASSEMBLY DISASSEMBLY

APPLICABLE CONFIGURATIONS: M10, M10A1, and M10A6

TOOLS: 3/16 flat tip screwdriver
5/16 open end wrench
Soldering iron
Long nose pliers

PERSONNEL: One

REFERENCE: JPG 41C for: Unsoldering wires
Tagging wires

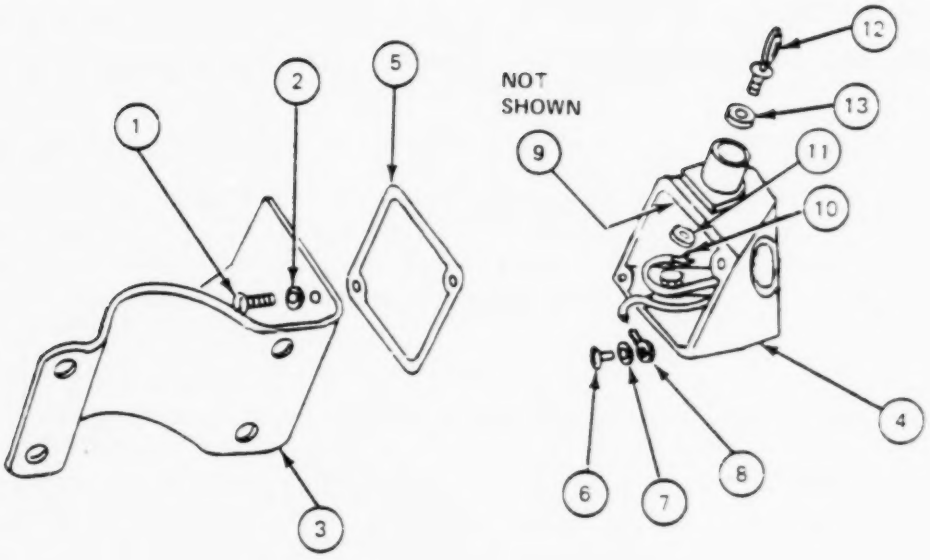
EQUIPMENT CONDITION: Light assembly on work bench

PRELIMINARY PROCEDURE: Light assembly removal (para 4-22)

FRAME 1

Step	Procedure
1.	Using flat tip screwdriver, remove two screws (1) and two lockwashers (2) from mount (3).
2.	Remove housing (4) and gasket (5) from mount (3).
3.	Using flat tip screwdriver, remove screw (6) and lock washer (7) holding terminal (8) to housing (4).
4.	Remove terminal (8) from housing (4).
5.	Using open end wrench, remove nut (9) from housing (4).
6.	Remove terminal (10), insulator (11), plug (12), and insulator (13) from housing (4). GO TO FRAME 2

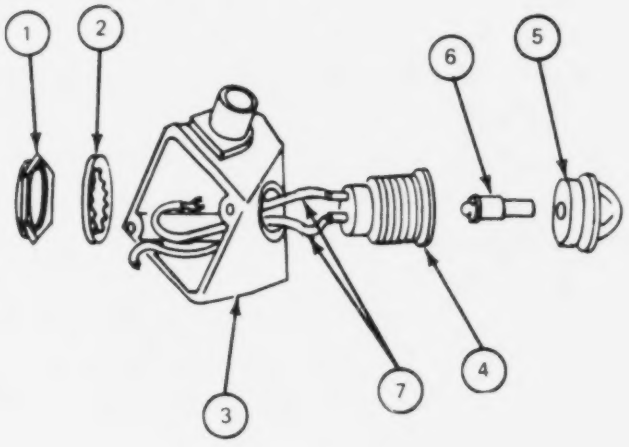
4-23. LIGHT ASSEMBLY DISASSEMBLY (CONT)



4-23. LIGHT ASSEMBLY DISASSEMBLY (CONT)

FRAME 2

Step	Procedure
1.	Using long nose pliers remove mounting nut (1) and washer (2) from housing (3).
2.	Pull light socket (4) out of housing (3).
3.	Turn lens (5) counterclockwise and remove from light socket (4).
4.	Remove lamp (6) from light socket (4).
5.	Tag two wires (7) (JPG).
6.	Using soldering iron, unsolder two tagged wires (7) from light socket (4) (JPG).
	END OF TASK



4-24. LIGHT ASSEMBLY ASSEMBLY

APPLICABLE CONFIGURATIONS: M10, M10A1, and M10A6

TOOLS: 3/16" flat tip screwdriver
5/16" open end wrench
Soldering iron
Long nose pliers

SUPPLIES: Solder

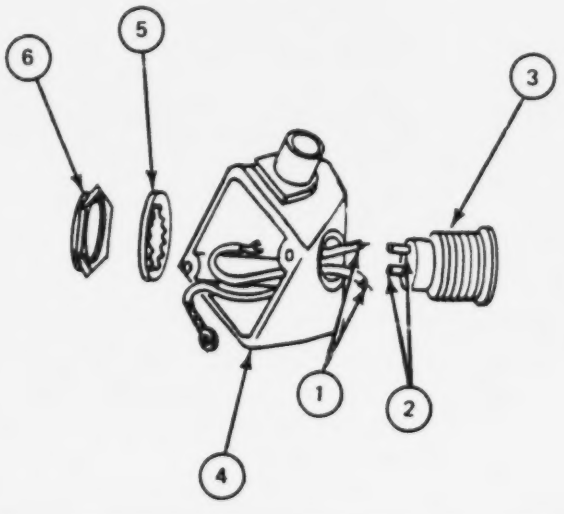
PERSONNEL: One

REFERENCES: JPG 41C for soldering wires

EQUIPMENT CONDITION: Light assembly on work bench

FRAME 1

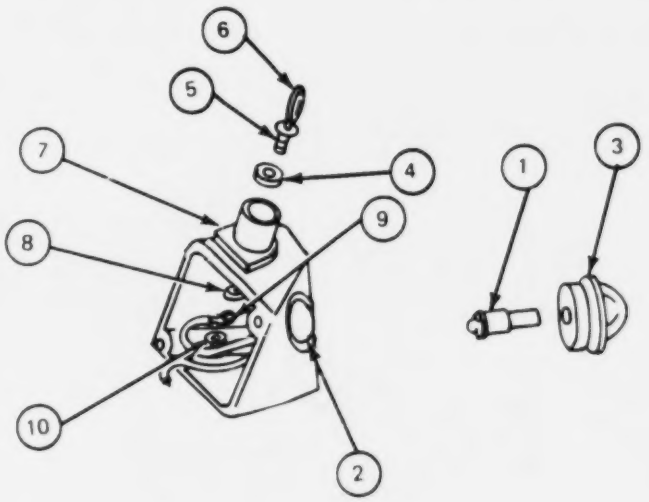
Step	Procedure
1.	Using soldering iron, solder two tagged wires (1) to lugs (2) of light sockets (3) (JPG). Remove tags.
2.	Place light socket (3) in housing (4).
3.	Using long nose pliers, install washer (5) and mounting nut (6) on light socket (3) and tighten.
	GO TO FRAME 2



4-24. LIGHT ASSEMBLY ASSEMBLY (CONT)

FRAME 2

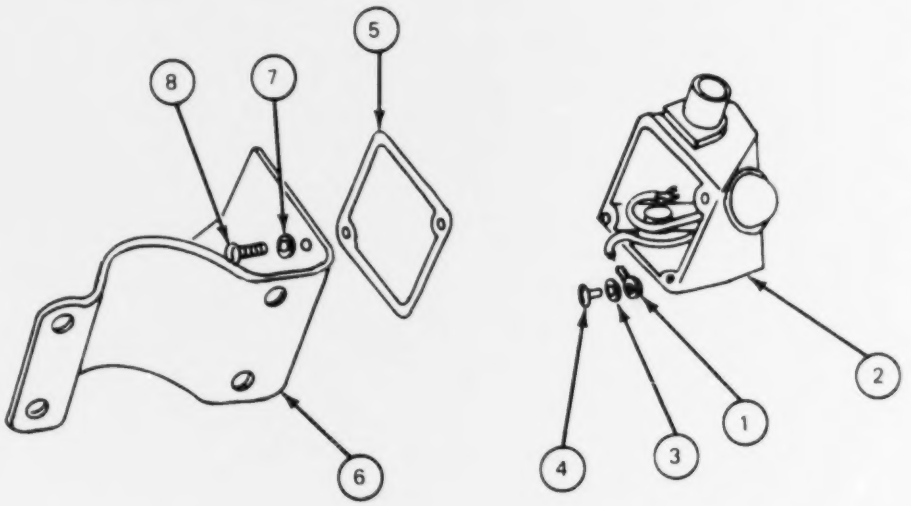
Step	Procedure
1.	Install lamp (1) into light **socket (2).**
2.	Align two slots in lens (3) with two pins in light **socket (2) and turn clockwise to tighten.**
3.	Place insulator (4) over tip (5) of plug (6).
4.	Install plug (6) into housing (7).
5.	Place insulator (8) over tip (5) of plug (6).
6.	Place style A terminal (9) over tip (5) of plug (6).
7.	Place hexagon nut (10) over tip of plug (6). Using open end wrench, tighten nut (10).
	GO TO FRAME 3



4-24. LIGHT ASSEMBLY ASSEMBLY (CONT)

FRAME 3

Step	Procedure
1.	Using flat tip screwdriver, secure style C terminal (1) to housing (2) with lockwasher (3) and screw (4).
2.	Place gasket (5) over flange of housing (2).
3.	Place mount (6) on gasket (5).
4.	Secure mount (6) to housing (2) with two lock washers (7) and two screws (8). Using flat tip screwdriver, tighten two screws (8).
	NOTE FOLLOW-ON MAINTENANCE Install light assembly (para 4-25). END OF TASK



4-25. LIGHT ASSEMBLY INSTALLATION

APPLICABLE CONFIGURATIONS: M10, M10A1, and M10A6

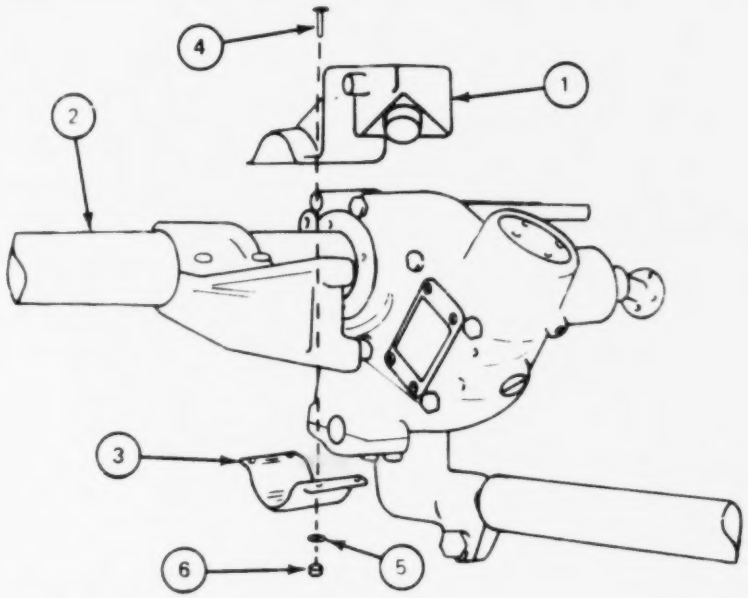
TOOLS: 7/16 box end wrench
7/16 open end wrench

PERSONNEL: One

PRELIMINARY PROCEDURES: Assemble light assembly (para 4-24)

FRAME 1

Step	Procedure
1.	Place light assembly (1) inside marks on cross shaft (2).
2.	Place clamp (3) inside marks on cross shaft (2).
3.	Align mounting holes of light assembly (1) and clamp (3).
4.	Place four cap screws (4) into mounting holes (4).
5.	Holding cap screws (4) with open end wrench, install four lockwashers (5) and four nuts (6) on the four cap screws. Using box end wrench, tighten nuts (6).
	END OF TASK



Section 9. RANGEFINDER LINK CONNECTOR ASSEMBLY

4-26. RANGEFINDER LINK CONNECTOR ASSEMBLY MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	Para 4-4, frames 2 and 3
Disassembly	4-27
Assembly	4-28
Installation	Para 4-5, frames 10, 11, and 12

4-27. RANGEFINDER LINK CONNECTOR ASSEMBLY DISASSEMBLY

TOOLS: 3/4 open end wrench
Scriber

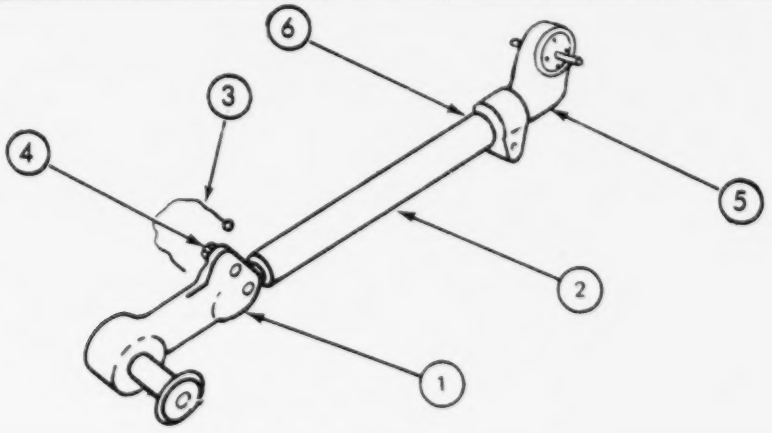
PERSONNEL: One

EQUIPMENT CONDITION: Rangefinder link connector assembly on work bench

PRELIMINARY PROCEDURE: Remove rangefinder link connector assembly (para 4-4, frames 2 and 3)

FRAME 1

Step	Procedure
	NOTE Count and record number of turns in steps 3 and 6.
1.	Using scriber, mark the position of the rear connector assembly (1) on tube assembly (2).
2.	Cut lead wire seal (3).
3.	Using 3/4" wrench, loosen capscrews (4).
4.	Holding tube assembly (2) turn rear connector assembly (1) counterclockwise and remove, counting the number of turns while removing it.
5.	Using scriber, mark the position on connector assembly (5) on tube assembly (2).
6.	Using 3/4" wrench, loosen capscrew (6).
7.	Holding tube assembly (2) turn connector assembly (5) clockwise, and remove, counting the number of turns while removing it.
	END OF TASK



4-28. RANGEFINDER LINK CONNECTOR ASSEMBLY ASSEMBLY

TOOLS: 3/4" open end wrench

PERSONNEL: One

EQUIPMENT CONDITION: Rangefinder link connector assembly on work bench

FRAME 1

Step	Procedure
1.	Screw connector assembly (5) on tube assembly (2) counterclockwise (left-hand thread) the number of turns recorded during removal procedures. Line-up connector assembly (5) with scribe mark on tube assembly (2).
2.	Using 3/4" wrench tighten capscrew (6).
3.	Screw rear connector assembly (1) on tube assembly (2) clockwise (right-hand thread) the number of turns recorded during removal procedures. Line-up rear connector assembly (1) with scribe mark on tube assembly (2).
4.	Using 3/4" wrench, tighten capscrew (4).
	NOTE FOLLOW-ON MAINTENANCE Install rangefinder link connector assembly (para 4-5 frames 10, 11, and 12). Do performance test (Vol I, para 2-2).
	END OF TASK

Section 10. JUNCTION BOX ASSEMBLY

4-29. JUNCTION BOX ASSEMBLY MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	4-30
Disassembly	4-31
Assembly	4-32
Installation	4-33

4-30. JUNCTION BOX ASSEMBLY REMOVAL

APPLICABLE CONFIGURATIONS: M10, M10A1, M10A4, M10A5, and M10A6

TOOLS: 1/2 box end wrench
1/2 open end wrench

PERSONNEL: One

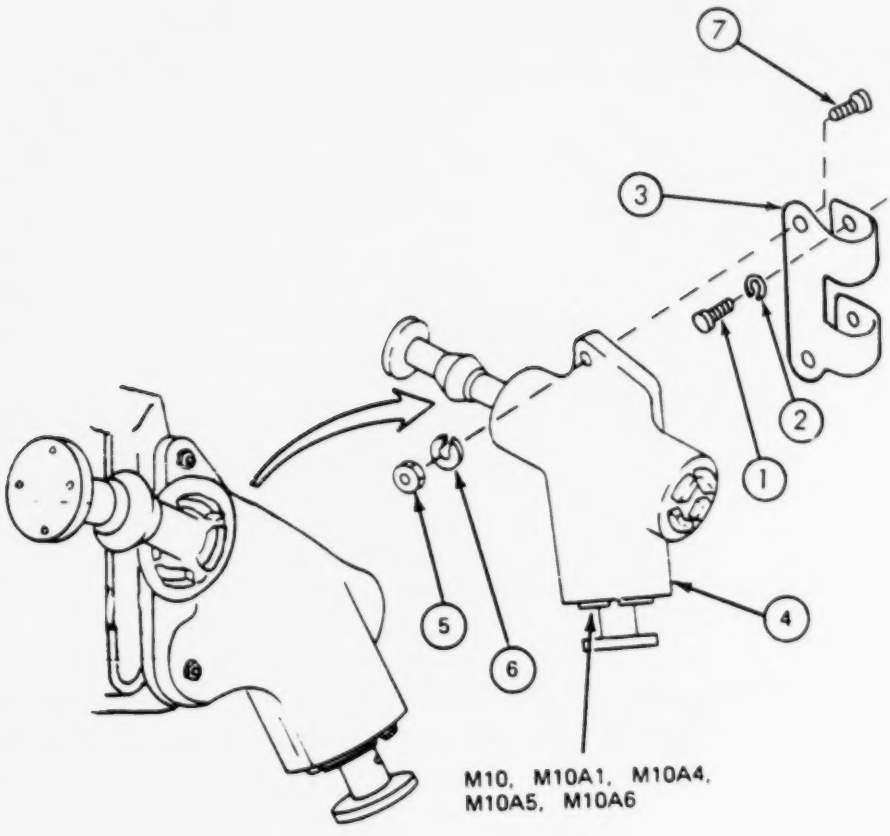
EQUIPMENT CONDITION: Junction box assembly mounted in turret

PRELIMINARY PROCEDURES: Remove ballistics drive (para 4-4, frames 4 and 5)

FRAME 1

Step	Procedure
1.	Using 1/2" box end wrench, remove two screws (1) and two lockwashers (2) holding bracket (3) to turret wall.
2.	Remove junction box (4).
3.	Using 1/2" box end wrench and 1/2" open end wrench, remove two nuts (5), two lockwashers (6), and two screws (7) holding bracket (3) to junction box (4).
4.	Remove bracket (3) from junction box (4).
	END OF TASK

4-30. JUNCTION BOX ASSEMBLY REMOVAL (CONT)



4-31. JUNCTION BOX ASSEMBLY DISASSEMBLY

APPLICABLE CONFIGURATION: M10, M10A1, M10A5, and M10A6

TOOLS: 4 oz. ball peen hammer
1/8" and 3/8" punch
Spanner wrench (App C, para C-3)
5/64" socket head screw key (Allen wrench or equivalent)
Brass drift pin
Vise

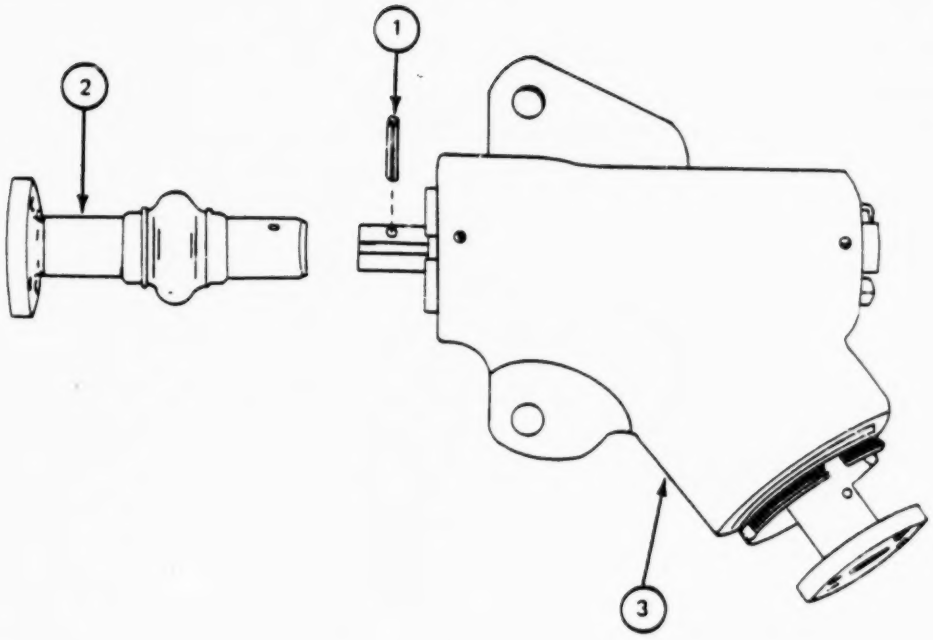
PERSONNEL: One

EQUIPMENT CONDITION: Junction box assembly on work bench

FRAME 1

Step	Procedure
1.	Locate one pin (1) securing universal assembly (2) to junction box assembly (3).
2.	Using hammer and 1/8" punch, drive one pin (1) out of universal assembly (2).
3.	Remove universal assembly (2) from junction box assembly (3).
	GO TO FRAME 2

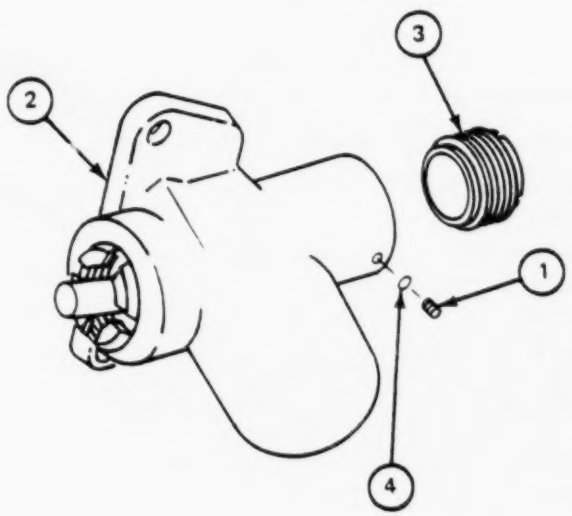
4-31. JUNCTION BOX ASSEMBLY DISASSEMBLY (CONT)



4-31. JUNCTION BOX ASSEMBLY DISASSEMBLY (CONT)

FRAME 2

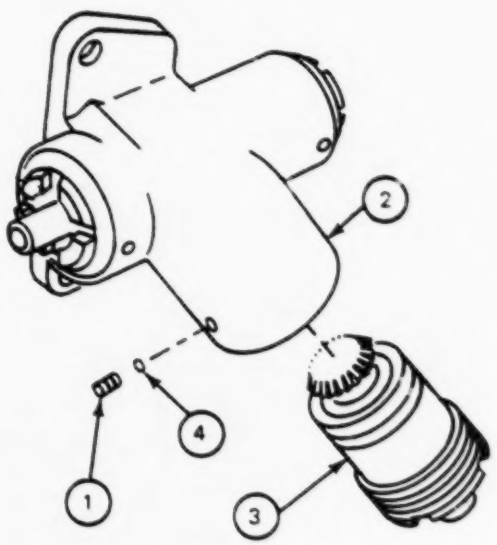
Step	Procedure
1.	Locate pin (1), securing coupling (2) to universal joint (3).
2.	Using hammer and 1/8" punch drive pin (1) out.
3.	Using hammer, 3/8" punch, and vise, drive coupling (2) from universal joint (3).
4.	Locate pin (4), securing hub (5) to junction box assembly (6).
5.	Using hammer and 1/8" punch, drive pin (4) from hub (5) and junction box assembly (6).
6.	Remove hub (5) from junction box assembly (6).
	GO TO FRAME 3



4-31. JUNCTION BOX ASSEMBLY DISASSEMBLY (CONT)

FRAME 2

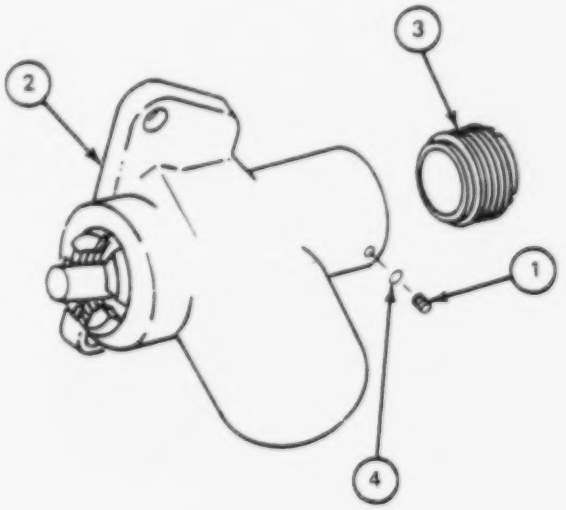
Step	Procedure
1.	Using Allen wrench, remove setscrew (1) from junction box assembly (2).
2.	**Using spanner wrench, turn sleeve assembly (3) to the left and remove from junction box assembly (2).**
3.	Using 1/8" punch, slowly push solid disc (4) from junction box assembly (2).
	GO TO FRAME 4



4-31. JUNCTION BOX ASSEMBLY DISASSEMBLY (CONT)

FRAME 3

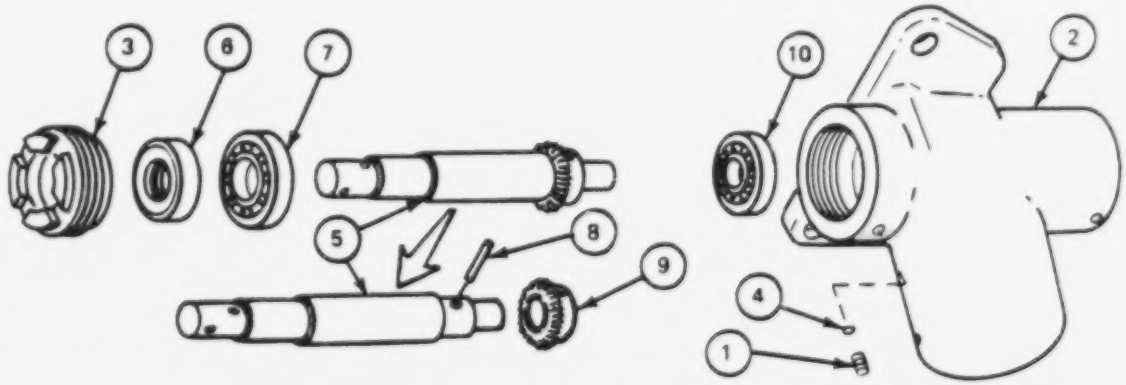
Step	Procedure
1.	Using Allen wrench, remove setscrew (1) from junction box assembly (2).
2.	Using spanner wrench, turn retainer (3) to the left and remove from junction box assembly (2).
3.	Using 1/8" punch, slowly push solid disc (4) from junction box assembly (2).
	GO TO FRAME 5



4-31. JUNCTION BOX ASSEMBLY DISASSEMBLY (CONT)

FRAME 4

Step	Procedure
1.	Using Allen wrench, remove setscrew (1) from junction box assembly (2).
2.	Using spanner wrench, turn retainer (3) to the left and remove from junction box assembly (2).
3.	Using 1/8" punch, slowly push solid disc (4) from junction box assembly (2).
4.	Remove shaft assembly (5) from junction box assembly (2).
5.	Using hammer and brass drift pin, remove seal (6) from retainer (3).
6.	Remove bearing (7) from shaft (5).
7.	Using hammer and 1/8" punch, drive pin (8) out, and remove gear (9) from from shaft (5).
8.	Using hammer and brass drift, gently tap bearing (10) from junction box assembly (2).
	END OF TASK



4-32. JUNCTION BOX ASSEMBLY ASSEMBLY

APPLICABLE CONFIGURATIONS: M10, M10A1, M10A4, M10A5, and M10A6

TOOLS: 3/16 flat tip screwdriver
4 oz ball peen hammer
Brass drift pin
1/8" punch
Spanner wrench (App C, para C-3)
5/64" socket head screw key (Allen wrench or equivalent)
Open end wrench

SUPPLIES: (Item 2, App A)

PERSONNEL: One

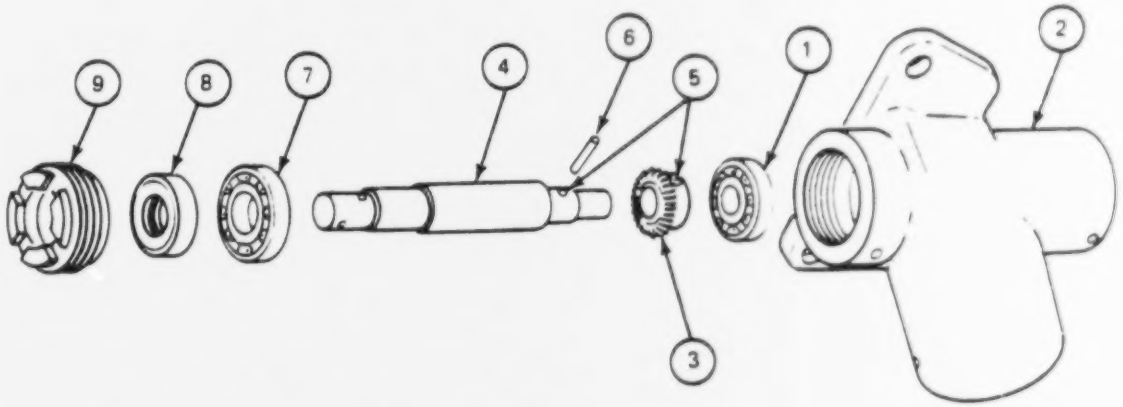
REFERENCES: JPG 41C for lubricating

EQUIPMENT CONDITION: Junction box assembly on work bench

4-32. JUNCTION BOX ASSEMBLY ASSEMBLY (CONT)

FRAME 1

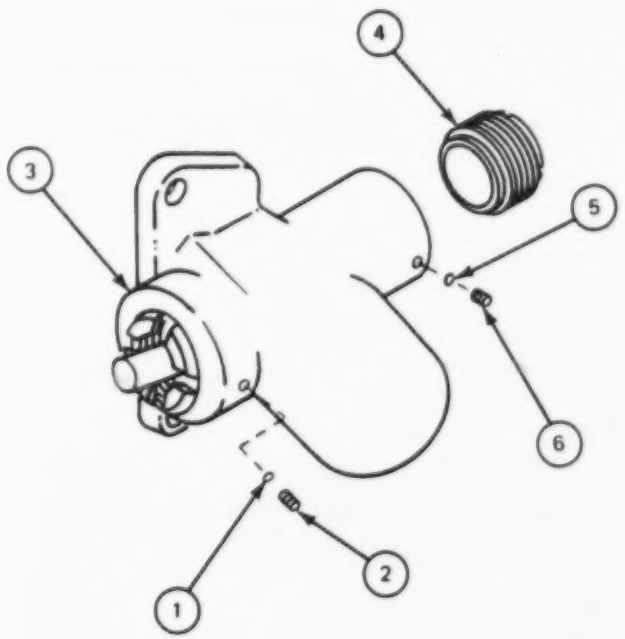
Step	Procedure
1.	Lubricate bearings (1) and (7) before installing (JPG).
2.	Place (small) bearing (1) in junction box assembly (2).
3.	Place gear (3) on shaft (4) with guide holes (5) lined up.
4.	Using hammer, drive pin (6) through guide holes (5).
5.	Place (large) bearing (7) on shaft (4).
6.	Place seal (8) on shaft (4).
7.	Insert shaft assembly (4) in junction box assembly (2).
8.	Using spanner wrench, install retainer (9) in junction box assembly (2). Do not tighten.
	GO TO FRAME 2



4-32. JUNCTION BOX ASSEMBLY ASSEMBLY (CONT)

FRAME 2

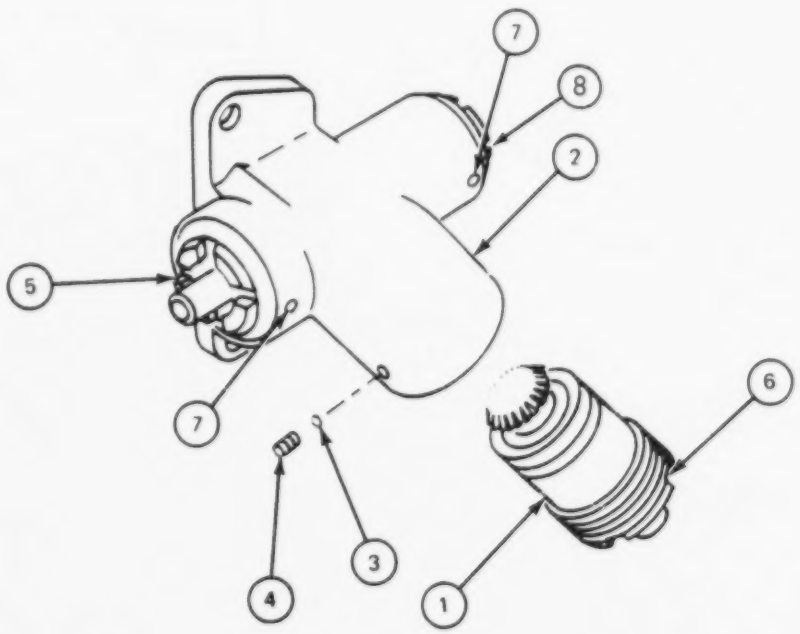
Step	Procedure
1.	Install solid disk (1) and using Allen wrench, install setscrew (2) into junction box assembly (3). Do not tighten setscrew (2).
2.	Using spanner wrench, install retainer (4) into junction box assembly (3). Do not tighten retainer (4).
3.	Install solid disc (5) and, using Allen wrench, install setscrew (6) into junction box assembly (3). Do not tighten setscrew (6).
	GO TO FRAME 3



4-32. JUNCTION BOX ASSEMBLY ASSEMBLY (CONT)

FRAME 3

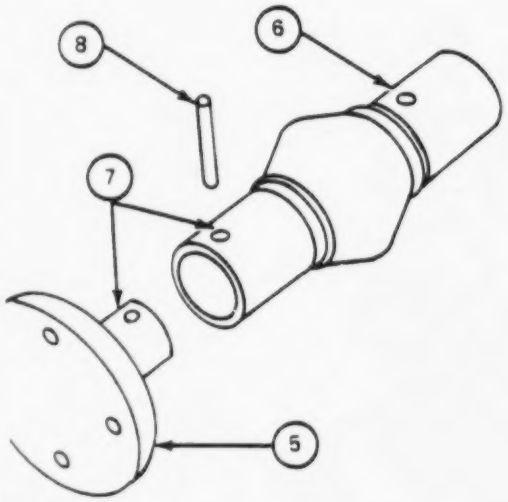
Step	Procedure
1.	Using spanner wrench, install sleeve assembly (1) into junction box assembly (2).
2.	Insert solid disc (3) and using Allen wrench, install setscrew (4) into junction box assembly (2). Do not tighten setscrew (4).
3.	Using spanner wrench, adjust (by tightening or loosening) three retainers, (5), (8) and (6) until shafts turn freely with no binding or free play.
4.	Using screwdriver, bend one tab into slots of retainer (6).
5.	Using Allen wrench, tighten three setscrews (4) and (7).
	GO TO FRAME 4

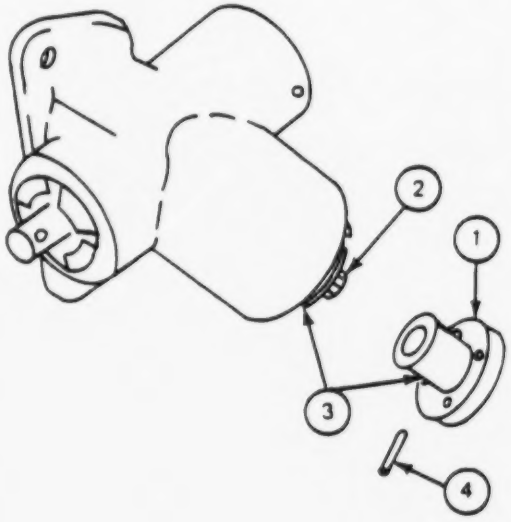


4-32. JUNCTION BOX ASSEMBLY ASSEMBLY (CONT)

FRAME 4

Step	Procedure
1.	Place hub (1) on shaft assembly (2). Line up guide holes (3).
2.	Using hammer and punch, drive pin (4) through guide holes (3).
3.	Place coupling (5) on universal joint (6). Line up guide holes (7).
4.	Using hammer, drive pin (8) through guide hole (7).
	GO TO FRAME 5

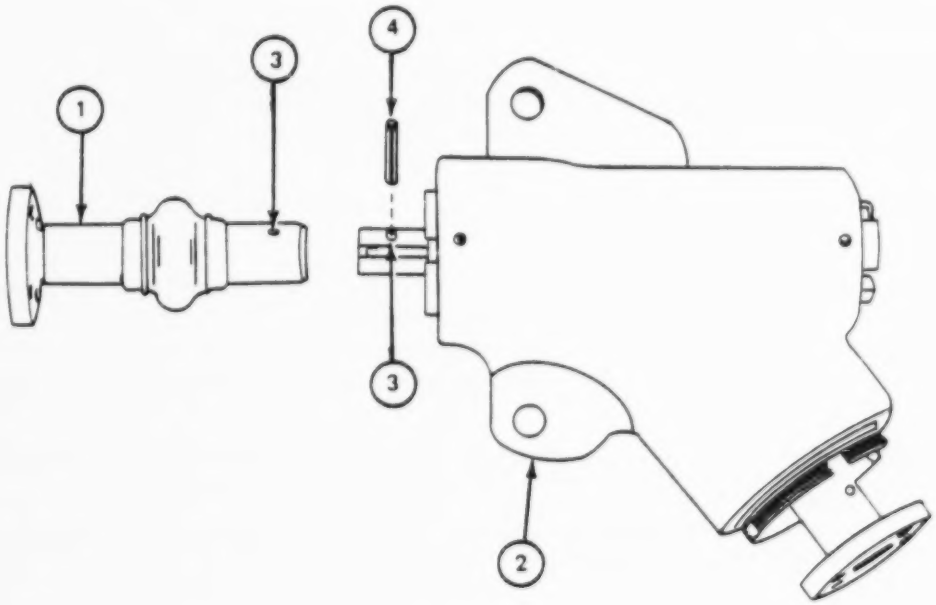




4-32. JUNCTION BOX ASSEMBLY ASSEMBLY (CONT)

FRAME 5

Step	Procedure
1.	Place universal assembly (1) on junction box assembly (2). Make sure guide holes (3) line up.
2.	Using hammer, drive pin (4) through guide hole (3). END OF TASK



4-33. JUNCTION BOX ASSEMBLY INSTALLATION

APPLICABLE CONFIGURATION: M10, M10A1, M10A4, M10A5, and M10A6

TOOLS: 1/2" box end wrench
1/2" open end wrench

SUPPLIES: Cleaning rag
Alcohol (item 1, App A) or solvent (item 4, App A)

PERSONNEL: One

REFERENCES: JPG 41C for cleaning

WARNING

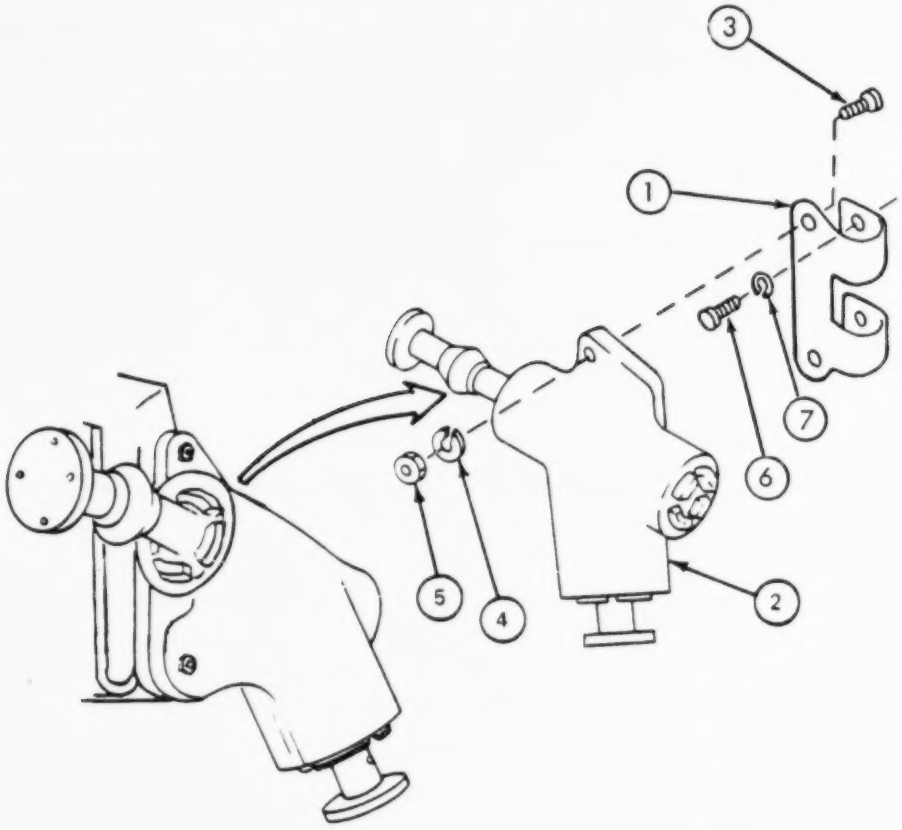
CLEANING SOLVENTS CAN CAUSE FIRES

Cleaning solvents and the fumes from cleaning solvents can catch fire. Keep it and all materials that can catch on fire away from flames. Use only in a room with alot of fresh air.

FRAME 1

Step	Procedure
1.	Using cleaning rag and alcohol or solvent, clean all turret mounting pads and ballistics drive mounting surfaces (JPG).
2.	Using 1/2" box end wrench and 1/2" open end wrench, install bracket (1) to junction box assembly (2) with two screws (3), two lockwashers (4) and two nuts (5).
3.	Using 1/2" box end wrench, install junction box assembly (2) and bracket (1) to shock mount (not shown) with two capscrews (6) and lockwashers (7).
	NOTE FOLLOW-ON MAINTENANCE Connect ballistics drive (para 4-5, frames 8 and 9). Do performance test (Vol I, para 2-2).
	END OF TASK

4-33. JUNCTION BOX ASSEMBLY INSTALLATION (CONT)



Section 11. SHAFT AND RELATED PARTS

4-34. SHAFT AND RELATED PARTS MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Disassembly	4-35
Assembly	4-36

4-35. SHAFT AND RELATED PARTS DISASSEMBLY

TOOLS: 1/16" flat tip screwdriver
4 oz ball peen hammer
1/8" pin driver

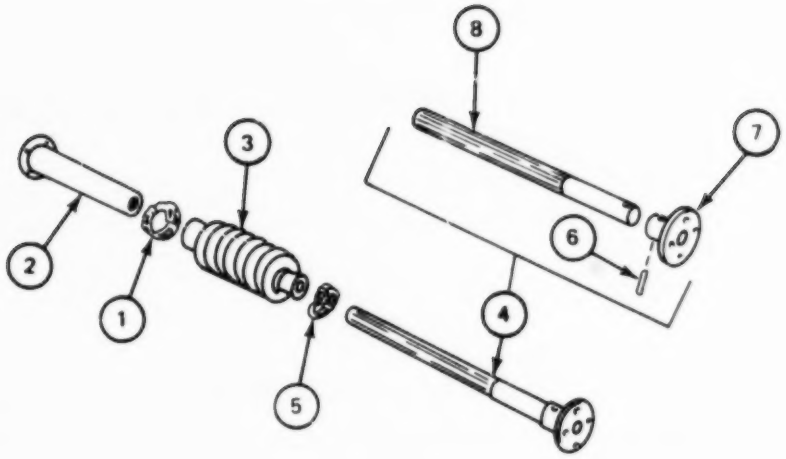
PERSONNEL: One

PRELIMINARY PROCEDURES: Remove shaft and related parts (para 4-4, frame 5)

FRAME 1

Step	Procedure
1.	Using flat tip screwdriver, loosen and slide hose clamp (1) onto shaft (2).
2.	Remove shaft (2) from dust boot (3) and shaft (4).
3.	Remove hose clamp (1) from shaft (2).
4.	Using flat tip screwdriver, loosen hose clamp (5) on shaft (4).
5.	Remove dust boot (3) and hose clamp (5) from shaft (4).
6.	Using hammer and pin driver, drive pin (6) out.
7.	Remove hub (7) from the shaft (8).
	END OF TASK

4-35. SHAFT AND RELATED PARTS DISASSEMBLY (CONT)



4-36. SHAFT AND RELATED PARTS ASSEMBLY

TOOLS: 4 oz ball peen hammer
1/8" punch
Long nose pliers

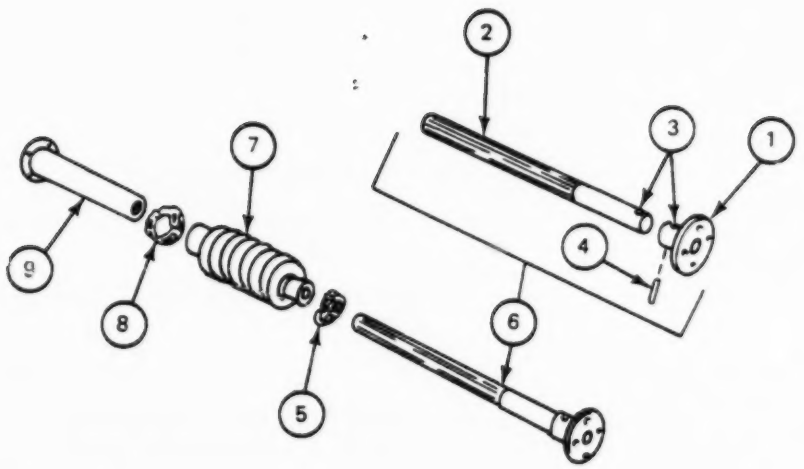
PERSONNEL: One

EQUIPMENT CONDITION: Shaft and related parts on work bench

FRAME 1

Step	Procedure
1.	Place hub (1) on the shaft (2). Make sure guide holes (3) line up.
2.	Using hammer and punch, drive pin (4) in.
3.	Place hose clamp (5) on shaft (6).
4.	Place smaller end of dust boot (7) on shaft (6) and, using long nose pliers, secure hose clamp (5).
5.	Place hose clamp (8) on shaft (9).
6.	Place shaft (9) into shaft (6). Slide dust boot (7) over shaft (9). Using long nose pliers secure hose clamp (8).
	NOTE FOLLOW-ON MAINTENANCE Install shaft and related parts (para 4-5, frame 8). Do performance test (Vol I, para 2-2).
	END OF TASK

4-36. SHAFT AND RELATED PARTS ASSEMBLY (CONT)



CHAPTER 5

FINAL INSPECTION

5-1. SCOPE

This chapter gives final inspection and maintenance procedures to be done after repairing the M10 Series Ballistics Drive.

5-2. BALLISTICS DRIVE FINAL INSPECTION

PERSONNEL: One

REFERENCES: JPG 41C for cleaning
TM 10 for: Operating gun
Boresighting
(TM 9-2350-215-10 for M60A1,
TM 9-2350-257-10 for M60A1 Rise, and
TM 9-2350-260-10 for M60).

TM 20-2 for synchronizing and aligning (TM 9-2350-215-20-2 for M60A1, TM 9-2350-257-20-2 for M60A1 Rise, and TM 9-2350-260-20-2 for M60)

EQUIPMENT CONDITION: Ballistics drive installed in vehicle

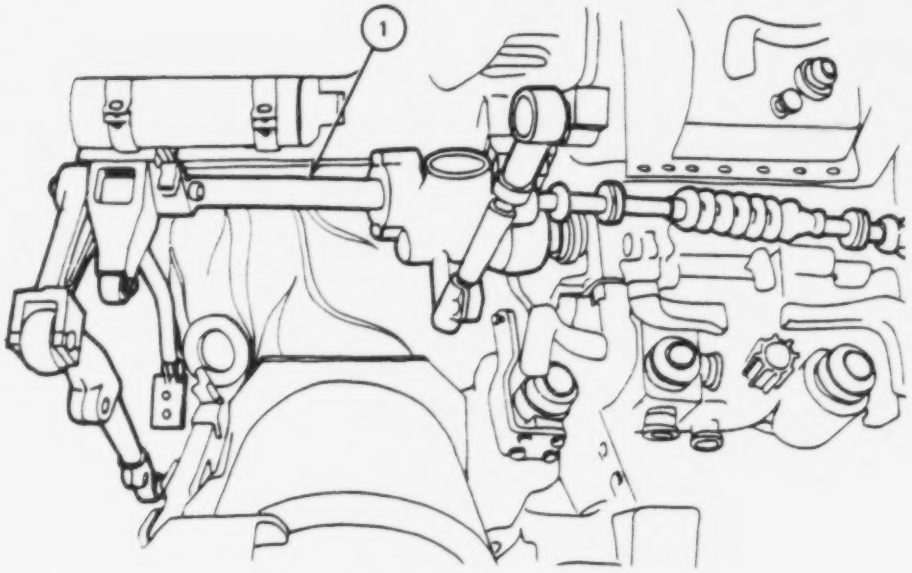
NOTE

If you find a fault, tell your supervisor. If you do not find a fault, send ballistics drive back into service.

5-2. BALLISTICS DRIVE FINAL INSPECTION (CONT)

FRAME 1

Step	Procedure
1.	Check ballistics drive (1) for loose or missing parts.
2.	Make sure ballistics drive (1) is free of dirt and corrosion.
3.	Elevate and depress the gun.
	NOTE FOLLOW-ON MAINTENANCE Do synchronization and alinement of fire control system (TM 20-2).
	END OF TASK



CHAPTER 6
PACKAGING

6-1. SCOPE

Instructions for packaging the M10 Series Ballistics Drive are found in MIL-P-116 and AR 700-15.

APPENDIX A
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section 1. Introduction

A-1. SCOPE

This appendix lists expendable supplies and materials you will need to repair the M10 Series Ballistics Drive. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic Items).

A-2. EXPLANATION OF COLUMNS

Column 1 - Item number. This number is assigned to the entry in the listing and is used in the manual to identify the material, for example, alcohol (item 1, App A).

Column 2 - Level. This column identifies the lowest levels of maintenance that requires the listed items.

F - Direct Support Maintenance

H - General Support Maintenance

Column 3 - National Stock Number. This is the national stock number assigned to the item. Use it to request or requisition the item.

Column 4 - Description. This tells the Federal item name and, if needed, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

Column 5 - Unit of Measure (U/M). This column shows how the item is measured; for example, you may see these abbreviations: ea (each), in (inches), or pr (pair). Order the smallest amount you need.

Section 2. EXPENDABLE SUPPLIES AND MATERIALS

(1) Item Number	(2) Level	(3) National Stock Number (NSN)	(4) Description	(5) U/M
1	F	6810-00-264-5906	Alcohol 16 oz bottle	BT
2	F	9150-00-985-7246	Grease, Aircraft, and Instrument, MIL-G-23827 1 lb can	LB
3	F	8010-00-297-2092	Paint, White 1 qt can	QT
4	F	6850-00-281-1985	Solvent, Dry cleaning 1 gal can	GL

APPENDIX B
MAINTENANCE TASK INDEX

B-1. SCOPE

This appendix helps you find maintenance tasks for the M10 Series Ballistics Drive. The maintenance tasks are referenced to help you find the procedure.

B-2. MAINTENANCE TASK INDEX (CONT)

BALLISTICS DRIVE: M10 (1220-00-676-2184) M10A1 (1220-00-076-9765) M10A3 (1220-00-572-8735) M10A4 (1220-00-856-9453) M10A5 (1220-00-980-9297) M10A6 (1220-00-933-1203)	MAINTENANCE TASKS								
NOMENCLATURE	INSPECTION UPON RECEIPT (VOL II)	FINAL INSPECTION (VOL II)	CHECKOUT (VOL I)	ADJUST, ALIGN, CALIBRATE (VOL II)	TROUBLESHOOT (VOL I)	REMOVAL/INSTALLATION (VOL II)	DISASSEMBLY/ASSEMBLY (VOL II)	TOOLS AND TEST EQUIPMENT (VOL I/VOL II)	NOTES
BALLISTICS DRIVE	Para 3-2	Para 5-2	Para 2-2	Para 4-5	Para 2-1	Para 4-4/ 4-5		Para 2-8	
DRIVE CONNECTOR						Para 4-10/ 4-11	Para 4-13/ 4-14		
FIRE CONTROL LEVEL					Para 4-14		Para 4-19/ 4-20		
JUNCTION BOX ASSEMBLY						Para 4-30/ 4-33	Para 4-31/ 4-32		
LIGHT ASSEMBLY						Para 4-22/ 4-25	Para 4-23/ 4-24		
LINK CONNECTOR						Para 4-10/ 4-11	Para 4-16/ 4-17		

B-2. MAINTENANCE TASK INDEX

BALLISTICS DRIVE: M10 (1220-00-676-2184) M10A1 (1220-00-076-9765) M10A3 (1220-00-572-8735) M10A4 (1220-00-856-9453) M10A5 (1220-00-980-9297) M10A6 (1220-00-933-1203) NOMENCLATURE	MAINTENANCE TASKS: INSPECTION UPON RECEIPT (VOL II)	FINAL INSPECTION (VOL II)	CHECKOUT (VOL I)	ADJUST, ALIGN, CALIBRATE (VOL II)	TROUBLESHOOT (VOL I)	REMOVAL/INSTALLATION (VOL II)	DISASSEMBLY/ASSEMBLY (VOL II)	TOOLS AND TEST EQUIPMENT (VOL I/VOL II)	NOTES
RANGE FINDER LINK CONNECTOR							Para 4-27/ 4-28		
SHAFT AND RELATED PARTS							Para 4-35/ 4-36		
TEMPERATURE COMPENSATING ROD						Para 4-7/ 4-8			
TRUNNION LINK							Para 4-10/ 4-11		

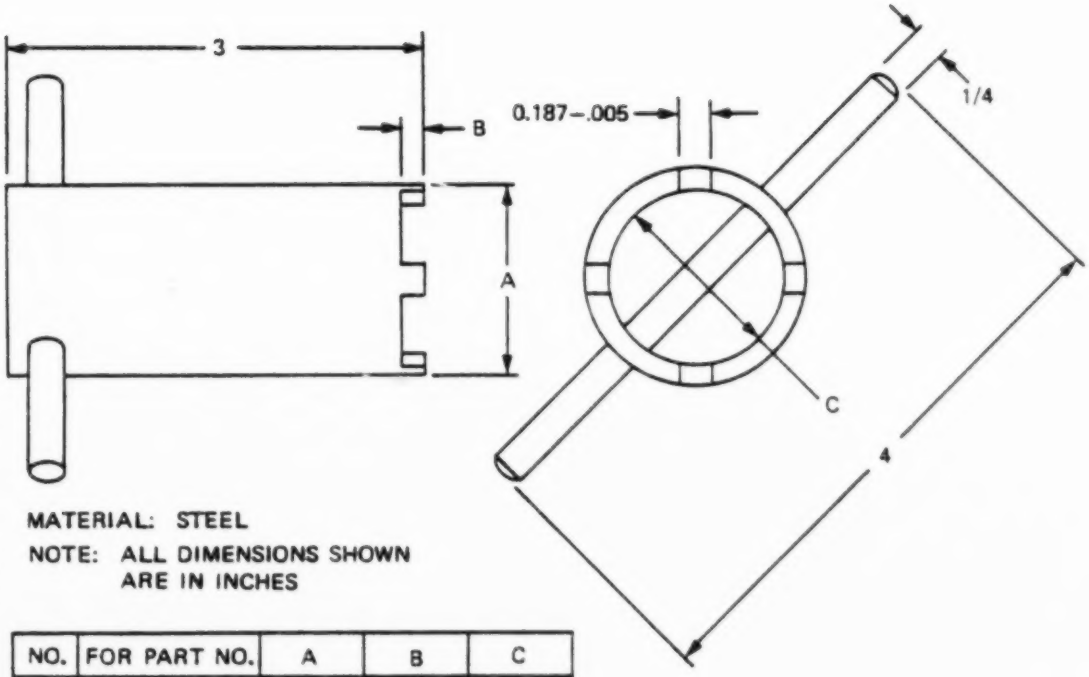
APPENDIX C

FABRICATED TOOL

C-1. SCOPE

The fabricated tool is used in the repair of the junction box assembly. The tool should meet the following specifications.

C-2. FABRICATED TOOL DIAGRAM



MATERIAL: STEEL

NOTE: ALL DIMENSIONS SHOWN ARE IN INCHES

NO.	FOR PART NO.	A	B	C
1	F8565537–118	1–3/8	5/32	1–1/8
2	F8565537–119	1–5/8	5/32	1–3/8
3	F8565537–120	1–1/16	7/32	3/4

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PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
3		2		Item 10. Change illustration. Reason: Tube end shown assembled on wrong side of lever cam.
109		51		Item 3. The NSN and P/N are not listed on the AMDF nor the MCRL. Request correct NSN and P/N be furnished.
2-8			2-1	Preventive Maintenance Checks and Services. Item 7 under "Items to be inspected" should be changed to read as follows: Firing linkage and firing mechanism pawl.
12	1-6a			Since there are both 20- and 30- round magazines for this rifle, data on both should be listed.

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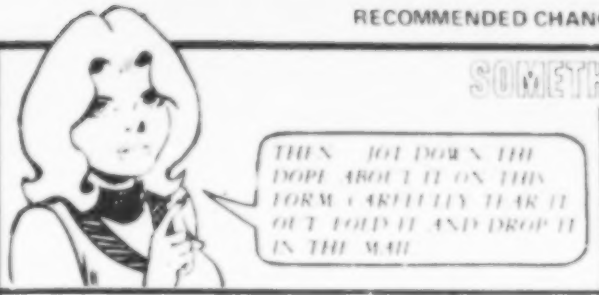

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

$5/9\,(^{0}F - 32) = {}^{0}C$
212^{0} Fahrenheit is equivalent to 100^{0} Celsius
90^{0} Fahrenheit is equivalent to 32.2^{0} Celsius
32^{0} Fahrenheit is equivalent to 0^{0} Celsius
$9/5\,C^{0} + 32 = F^{0}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

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